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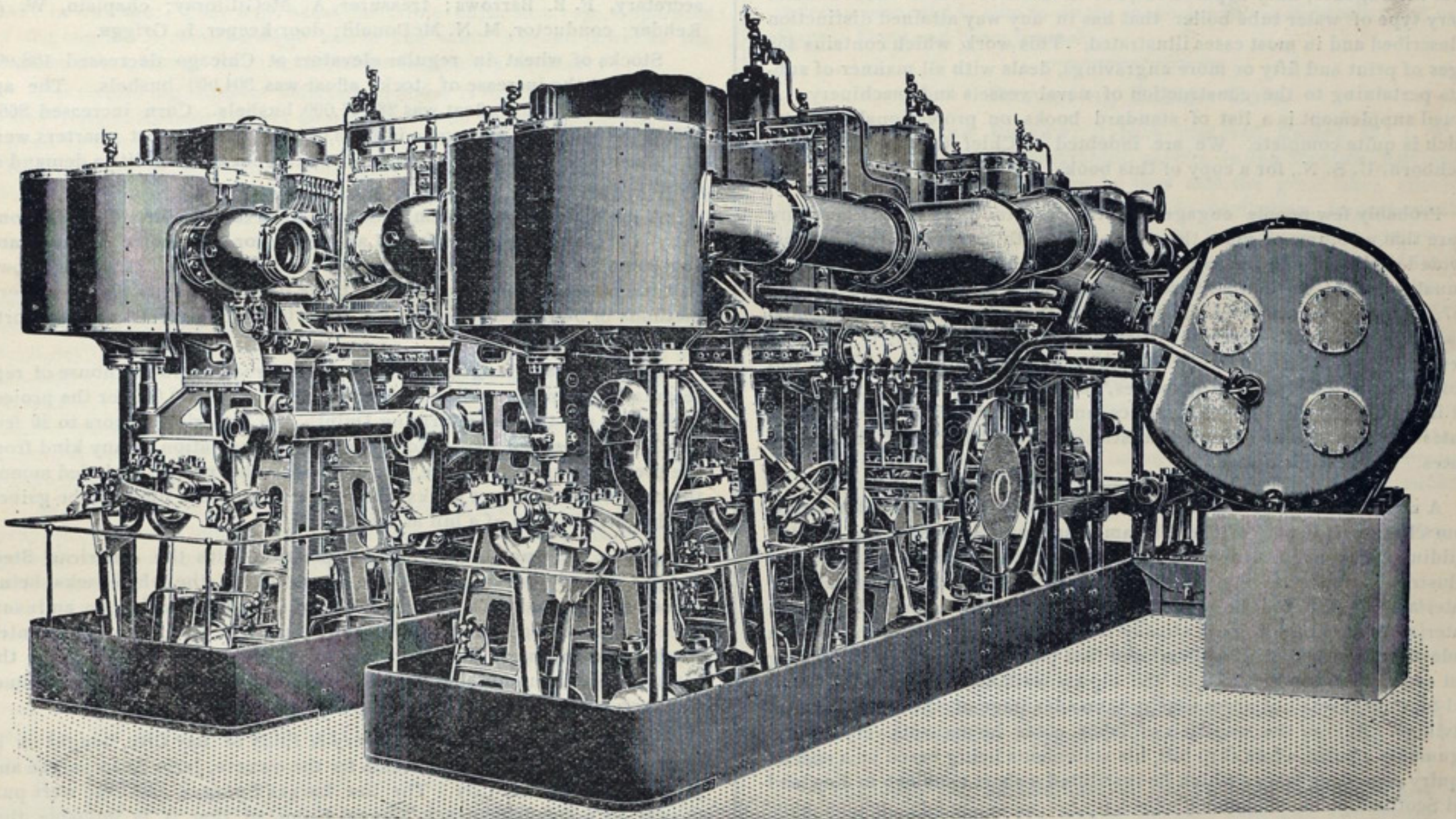
A Yacht Combining Requirements of a Cruiser.

The triple expansion engines illustrated on this page are fitted to the twin-screw yacht *Giralda*, a boat that recently made on trial on the Clyde 20.9 knots, the power developed being 8,500 indicated horse power at 220 revolutions. The *Giralda* was built by the Fairfield Ship Building and Engineering Company of Glasgow. She combines the principal features of a pleasure craft and a cruiser, speed and coal endurance being the principal considerations. Sixty members of the British naval reserve make up this boat's crew. Her coal carrying capacity will enable her to make a voyage of over 3,500 nautical miles at a speed of 15 knots, or nearly 6,000 nautical miles at a speed of 12 knots. She is 312 feet over all, 275 feet on load water line, 35 feet 1½ inches extreme breadth, 19 feet depth and of 1,508 tons register. There is a complete system of water-tight compartments cutting off the engines from the boilers, and dividing one set of boilers from another. Only in some bulkheads have doors been provided, and these can be closed from the main deck. The coal bunkers completely surround the boiler-rooms, and the side bunkers are carried inwards over the top of the boilers to the height of the upper deck, and along the whole length of the engine space.

pounds per square inch. They are 12 feet 1 inch in diameter, the double-ended being 18 feet 3 inches long and the single-ended 16 feet. They are adapted to work with moderate forced draught and closed stokeholds. The boilers are fitted in two separate boiler rooms, and arranged with one large funnel, air being supplied by ventilators for natural draught and fans for forced draught. The stokeholds are fitted with See's patent ash-ejectors. Machinery and fittings are all of a light description, steel and brass being largely used. This description of the boat and the engraving are from Engineering of London.

Major Ruffner is Disturbed.

Editor MARINE REVIEW: Your issue of Jan. 17, has on page 10, in reference to the subject of the gauging of the Niagara river: "A later issue of the same journal, (the Engineering News,) date of Jan. 10, 1895, contains an editorial article and a letter from Geo. Y. Wisner of Detroit, directing attention to the probability of great error in the Niagara calculations." This is what is generally called "whole cloth." There is not one word in either article, in fact not in the whole paper, that I can find, about the Niagara river at all. You have been misinformed,



The propelling machinery consists of two sets of triple expansion engines, each set having four cylinders working on four cranks. Each set has one high pressure cylinder 25 inches in diameter, one intermediate pressure cylinder 40 inches in diameter, and two low pressure cylinders 45 inches in diameter, all adapted for a stroke of 2 feet 3 inches. The high pressure cylinders are each fitted with a piston valve, and the intermediate and low pressure cylinders with a flat slide valve, all being worked by the ordinary double eccentric and link motion valve gear. The cylinder covers and pistons are of cast steel, and the reversing gear is of the all-round type, with worm and wheel gear worked by a small steam engine. Condensers are constructed of sheet brass, separate and distinct from the main engines, and placed in the wings of the ship. Condensing water is supplied by two large centrifugal engines with pumps of brass. The main and auxiliary feed pumps are separate and distinct from the main engines. Two fire and bilge engines are also fitted in the engine rooms. The shaft for each engine consists of two pieces, each with two double-throw cranks, and, together with the tunnel shafting, is hollow. The propellers are fitted with blades of bronze, Crank and thrust shafts are 10¾ inches in diameter, and the propeller shaft 11 inches, all with a 5-inch hole. Steam is supplied by three double-ended and two single boilers made entirely of steel, having a total of sixteen ribbed furnaces, and constructed for a working pressure of 170

and can not have read the paper referred to at all. Let us deal with a great question fairly, not by snap statements, slurs and misstatements.

E. H. RUFFNER,

Major of Engineers.

BUFFALO, Jan. 19, 1895.

Several criticisms of Major Ruffner's determinations regarding the Niagara river outflow appeared in the REVIEW in issues previous to that of last week containing the paragraph to which he refers. All of them were of a fair and honest kind, as our readers will undoubtedly bear us out, but Major Ruffner saw fit to answer none of them. We can hardly be blamed, therefore, if we are not very much worried about the possibility of being misinformed in the matter of opinion expressed in the Engineering News, when Major Ruffner refers to all that has been printed on the subject in the REVIEW as "snap statements, slurs and misstatements." We have learned to regard very highly any opinion of an engineering kind coming from a member of the United States engineer corps on account of the high character of men who have been engaged in the service on the lakes, and no exception was made in the case of the Buffalo officer, if he did overstep his senior officers in advancing opinions that provided thunder for Chicago engineers who have schemes in opposition to the drainage canal. But the source of Major Ruffner's discomfiture is found in a Washington dispatch of the 18th, in which his chief, Gen. Casey, is reported as saying to Congressman Daniels of the river and harbor committee that the theory of a great reduction in lake levels on account of water to be drawn from Lake Michigan by the canal is ridiculous.—ED.

Printed Matter of Interest on the Lakes.

Edward C. O'Brien, who was commissioner of navigation under President Harrison and who was recently appointed commissary general on the staff of Governor Morton of New York, has a very interesting article in a recent issue of the New York Times directing attention to the fact that New York's commercial interests are seriously threatened by progress being made with the Canadian 14-foot canal system. Mr. O'Brien makes no particular recommendation for Erie canal enlargement schemes, but insists that New York can not keep her place unless provision is soon made for adequate waterways between the Hudson and the great lakes. He presents these figures on the question of distance involved in the subject of cheap transportation from interior and western states to the seaboard: From Liverpool to New York is 3,040 miles. From Liverpool to Montreal is 2,790 miles. From New York to Duluth (via railway to Buffalo) is 1,437 miles, and via the Erie canal, 1,517 miles. From Montreal to Duluth, via the St. Lawrence, 1,354 miles. From Liverpool to Duluth, via Montreal and the St. Lawrence, is 4,144 miles, which will shortly be unbroken deep water navigation. From Liverpool to Duluth, via New York, is 4,477 miles, or 4,557 miles, according to the route via the New York Central railroad or the Erie Canal to Buffalo. Montreal is 250 miles nearer Liverpool than New York is, and 83 or 163 miles nearer Duluth. From Liverpool to Duluth the route, via Montreal, is 333 or 413 miles shorter than the route via New York.

About fifty pages of the volume, "Notes on the Year's Naval Progress," which is one of the most valued publications emanating from the office of naval intelligence, navy department, are devoted to water tube boilers. Every type of water tube boiler that has in any way attained distinction is described and in most cases illustrated. This work, which contains 458 pages of print and fifty or more engravings, deals with all manner of subjects pertaining to the construction of naval vessels and machinery. A valued supplement is a list of standard books on professional subjects, which is quite complete. We are indebted to Chief Constructor Philip Hichborn, U. S. N., for a copy of this book.

Probably few people engaged in the fish industry of the lakes are aware that a volume of more than 300 pages, with numerous illustrations, devoted exclusively to the fisheries of the great lakes, forms a part of the annual report of the United States commissioner of fish and fisheries for 1887. Among other later publications from the office of the fish commission is an article on the "Fishing Industry of Lake Erie, Past and Present," by C. M. Keyes, and "Remarks on the Maintenance and Improvement of the American Fisheries," by Hugh M. Smith, M. D., assistant in charge of division of statistics and methods of fisheries, United States fish commission; also "Statistics of the Fisheries of the United States," by the same officer.

A recent number of the New York Times contained a valuable article from Charles H. Cramp of the William Cramp and Sons Ship and Engine Building Company, dealing with the effect on the American ship building industry of a bill granting free admission to foreign-built ships and the materials of ship building. Of course Mr. Cramp explained that the materials of ship building are already free, so far as vessels for the foreign trade are concerned, and he dismissed that part of the subject by saying that even in the construction of the big transatlantic steamers St. Louis and St. Paul it was not necessary to take advantage of the free material privilege. But on the question of labor costs he presents very strong arguments against a free ship bill, his statements being based on a special inquiry regarding wages which he instituted a short time ago in England and Scotland.

Appendix D D D of the annual report of the chief of engineers, U. S. A., for 1894 deals with surveys of the lakes, correction of engraved plates printing and issuing of charts, and other work of this kind under the direction of Gen. Poe of Detroit. Full details are given regarding the progress of this work as reported by Lieut. Riche at Sault Ste. Marie and other engineers who have had immediate charge at other places.

The war department has issued in pamphlet form the report of the engineers who recently recommended a deepening of the harbors of Duluth and Superior to 20 feet. The report is accompanied by maps that fully illustrate the project. Copies may be secured through representatives or senators at Washington.

Edgar Stanton Maclay's "History of the United States Navy" is still being referred to in a favorable way by various journals throughout the country, although both volumes of the work have been on sale for some time past. The price in cloth is \$3.50 per volume. D. Appleton & Co., New York, are the publishers.

A biographical sketch of the veteran engineer, John Fritz, written by J. F. Holloway of New York, will appear in the February number of Cassier's Magazine.

Around the Lakes.

C. W. Elphicke of Chicago is on his way east and will sail for England next week.

Auditors of lake counties in Ohio will find that they have undertaken a big job when they come to separating interests in iron ore on Lake Erie docks, if they insist upon trying to tax the ore.

Simeon Cobb, who was owner of lumber-carrying boats in Chicago, died at his home in that city a few days ago. He was fifty-eight years of age and had been identified with lake business in Chicago for about forty years.

H. G. Trout & Co. of Buffalo, (King Iron Works Foundry) are now making the Trout wheel when wanted of a mixture of cast iron and steel, which gives double the strength. They also make other castings of the same metal.

C. R. Jones & Co. of Cleveland have sold the steamer Desmond for the Jenks Ship Building Company of Port Huron. The purchasers are W. H. White & Co. of Pine Lake and the price \$30,000. The Cleveland company will handle the boat.

In accordance with the scheme of improving the Cuyahoga river so as to increase inner harbor facilities, the city council of Cleveland has appropriated \$25,000 to be used immediately in widening the main river between the central viaduct and the old river bed.

Officers of M. E. B. A. No. 78 of Duluth for the year 1895 are as follows: Past-president, R. A. Webster; president, A. Beauchemin; vice-president, A. Harvey; representative to national convention, A. McGillivray; secretary, F. B. Barrows; treasurer, A. McGillivray; chaplain, W. A. Rehder; conductor, M. N. McDonald; door-keeper, L. Griggs.

Stocks of wheat in regular elevators at Chicago decreased 108,000 bushels but the increase of stocks afloat was 304,000 bushels. The aggregate in store and afloat was 26,941,000 bushels. Corn increased 866,000 bushels and the aggregate is 4,956,000 bushels. Latest charters were at 2¼ cents on corn and 2½ cents on wheat, but there is little demand at these figures.

A Buffalo newspaper item intimates that the Western Transit Company is preparing to retire from Lake Superior passenger business and that a similar move is contemplated by the Anchor line. It is well known that the passenger boats of both of these lines are not suited to modern methods in passenger business, but there is nothing official about reports of their retirement.

Congressman Haugen of Duluth has introduced in the house of representatives a bill providing an appropriation of \$3,000,000 for the project of digging out the basin forming Duluth and Superior harbors to 20 feet depth. He does not expect to secure an appropriation of any kind from the present congress, but the plan is to have this project included among the continuous contract works, and it is thought that time will be gained by the introduction of a bill at this time.

Angus McDougall, who lost his position with the American Steel Barge Company on account of the operation of the whalebacks being turned over to Pickands, Mather & Co. of Cleveland, will open an insurance and brokerage office in Duluth. Capt. J. B. Hall, who represented the barge company in Cleveland, has not as yet fixed upon plans for the future. He can undoubtedly secure command of a big boat at any time, as his record at sailing was fortunate and successful.

At Toledo, Saturday, Eddy, Avery & Eddy of Bay City, bought in at marshal sale the steamer Germania for the owners, Jerry Shampagne and J. G. Hannon of Bay City. The tow barges Sprague and Case were purchased by a Toledo attorney, Samuel Kohn, so that it is probable that Messrs. Shampagne and Hannon will continue to operate the boats. The prices at which the boats were legally disposed of were \$5,600 for the Germania, \$1,720 for the Sprague and \$505 for the Case.

Officers of the weather bureau in Chicago have arranged to use a search light in the auditorium tower for the purpose of displaying signals. It is expected that signals made by the light will be of special advantage in thick weather during the season of navigation. The light will be thrown from a 14-inch lens and it is calculated that it will be visible for a radius of fourteen miles. For a cold wave the color will be green, for a storm from the east red, and for a western storm white.

Dry dock managers who met in Buffalo a few days ago will meet in Port Huron next year. On the claim that there was little money in the business, they refused to reduce charges upon the request of the members of the Lake Carriers' committee who attended their meeting. The only concession made had reference to boats docked with cargoes. Previously a charge of 10 cents a ton was made for cargo in addition to the regular charges made for the vessel. In future the additional charge for cargo will be only 5 cents a ton up to 1,000 tons, and for all in excess of 1,000 tons only 2½ cents a ton. Officers of the association for the ensuing year are: President, George Quayle of Cleveland; vice-president, W. E. Fitzgerald of Milwaukee; secretary and treasurer, Hamilton Mills of Buffalo.

Ships Capable of Carrying 51,450 Gross Tons.

Contracts closed by lake ship builders within the past week bring the total number of new vessels on the stocks up to thirty-three, having an aggregate value of \$3,612,500. Seventeen of the vessels are freight carriers, most of them of the largest type, and their combined capacity on extreme draft is 51,450 gross tons.

Two contracts for freight vessels reported during the past few days are among the most important announcements as yet made in connection with ship yard work. The Chicago Ship Building Company is to build a second steamer of 380 feet keel, which will be practically a duplicate of the big boat for which they closed a contract with the Interlake Company of Cleveland several days ago. This second boat is for a syndicate of vessel owners, which is understood to include A. B. Wolvin and F. N. LaSalle of Duluth, J. R. Irwin of Fairport, G. E. Tenner of Pittsburg, John Green of Buffalo and some of the stockholders of the Illinois Steel Company. For the first time in this country water tube boilers are to be used in a freight steamer of large tonnage, through conditions attending this contract. The boilers are to be of the Babcock & Wilcox type and will furnish steam at 200 pounds pressure. This feature of the contract is indicative of the progressive disposition of Mr. Babcock, general manager of the Chicago company, and it also shows that the Babcock & Wilcox Company is determined to push the adoption of its marine type of tubular boilers in ships of all kinds. The Babcock & Wilcox Company has also closed a contract with Charles Fletcher of Providence, R. I., for tubular boiler for his yacht Seneca, to develop 500 I. H. P. The Cleveland Ship Building Company will build the engines for this second boat to be built in Chicago. They will be of the triple expansion type, duplicates of the engines in the Kearsarge and of the same size and power as the engines that are to go into the Interlake Company's steamer.

The second big contract referred to above is for the construction of a steel freight steamer 375 feet keel, 45 feet beam and 28 feet depth, to be owned by Robert R. Rhodes, John W. Moore, John Bartow and others of Cleveland, and to be built by the Cleveland Ship Building Company. With this contract the Cleveland Ship Building Company now has under way two steel freight steamers and four sets of triple expansion engines, two of the latter being for the Chicago Ship Building Company.

In addition to building two wooden steamers of about 3,300 net tons capacity on 16 feet draft, a schooner of 2,800 tons capacity on the same draft and two lighters costing about \$15,000 each, Capt. James Davidson of West Bay City is rebuilding the wrecks of the steamer Waldo A. Avery and schooner Lizzie A. Law. The rebuilt boats, as well as the new ones, will be ready for service upon the opening of navigation in the spring. The triple expansion engines for the two steamers, which are being built for Capt. Davidson by the Frontier Iron Works, will each have cylinders of 20, 33 and 54 inches in diameter with a stroke of 42 inches.

As a result of the fire at the Frontier Iron Works, Detroit, that company will doubtless build a modern foundry, and thus keep pace with the general march of improvement in engine building plants. It is a well understood fact that in these days of close competition it is necessary to take advantage of improved appliances and methods in order to secure business.

Both of the 330-foot steel steamers building at South Chicago will be built under the rules of the United States Standard Register of Shipping, New York. Frames, floors, beams and stringers will be channel sections, the construction throughout being on Mr. Sinclair Stuart's system.

S. F. Hodge & Co. of Detroit, builders of the machinery of the whaleback passenger steamer Christopher Columbus, are constructing new cylinders for the engines, the high-pressure cylinder being increased from 26 to 28 inches in diameter, so as to give the boat more power.

Eight Scotch boilers for the two car ferries being built by the Craig Ship Building Company of Toledo will be constructed by the Globe Iron Works Company of Cleveland.

A. D. Story, Essex, Mass., is building for the Winthrop (Mass.) Steamboat Company, a steamer 110 by 23 by 7 feet with capacity for 900 passengers; two engines and screws by Edward Clarke & Co., Boston, Mass.; boat designed by Waterhouse & Chesebrough. The Steamer John Nise, being constructed at the same yard on builder's account, is 130 by 28 by 10½ feet and is intended for the coast stone trade. Four schooners, 70, 90, 103 and 107 feet long, are also being constructed at this yard for Edgar Randall, Beverly, Mass., David B. Smith & Co., Gloucester, Mass.

Capt. Louis is building a 100-foot steamer at Rat Portage, Ont., for passenger business between that place and Fort William. Capt H. Servais and Hazelwood & Whalen are doing considerable rebuilding at Port Arthur, Ont.

In addition to the two Lake Erie ferry boats, 300 by 52 by 20 feet, reported in the ship building edition of the REVIEW, the Craig Ship Building Co., Toledo, O., have under way two 50-foot steam yachts for the Columbian Beach Company and T. H. Peacock, two 35-foot cruising

launches for J. V. Somfretre and Jas. M. Hough, and two other launches for G. G. Hadley, Jr., and C. W. Taylor, the valuation of the six boats amounting to \$10,200. The two steam yachts will be finished in white oak and the others will be given a mahogany finish.

The Pusey & Jones Company, Wilmington, Del., is building a propeller for the U. S. engineers, Philadelphia, Pa., 60 by 16 by 7½ feet and of \$16,000 value, and a steam yacht 139 by 16 by 7 feet for H. B. Moore, New York, valued at \$11,000.

R. C. Brittain, Saugatuck, Mich., is building two tugs, one 65 and the other 50 feet long.

The Oregon Railway & Navigation Company, Portland, Ore., will build a 164-foot steamer, 34 feet beam and 5 feet deep.

A Good Word for Admiral Meade.

If the bureau officers at Washington will accept our well-intended advice, they will not hatchel Admiral "Dick" Meade any more than is essential to the purposes of discipline. The action in the matter of the Cincinnati court of inquiry was unwise and ungenerous, and the stand the admiral took in that case has won for him the approval of the entire service. He fought not for himself, but for the dignity of his commission. Admiral Meade has faults—we love him in spite of them. He is a man of undoubted ability and of large experience in the service. If he is a hard hitter he is a square fighter, and you never have to burrow under the surface to find him. The world would stagnate but for such men, and it is refreshing to find in a service much hampered with routine and precedent a man who is able to retain so much of his individuality and native force.—Army and Navy Journal.

Answering Ensign Cole.

Editor MARINE REVIEW: I have just read Ensign W. L. Cole's article supporting the hydrographic service in the MARINE REVIEW of Jan. 17, 1895. He is right when he says that the great lakes should be supplied with charts showing dangers to navigation, improvements as they now exist, etc. Such charts, however, are already in existence.

The necessity for lake charts was foreseen by congress over fifty years ago, and since then the entire lake coasts of the United States have been surveyed and charted at a cost of about \$3,000,000. These charts are being constantly amended as fast as river and harbor improvements are made, and new aids and dangers to navigation are added to them as soon as located. Mr. Cole proposes to do this work over again, with an equipment of less than \$1,500, and for running expenses such small portion of \$20,000 as the hydrographic office can spare to the lakes from "the immense work the office is carrying on on the Atlantic and Pacific coasts." These resources are utterly inadequate, as they would not be sufficient for an accurate survey of a single harbor.

CHARLES S. RICKE.

SAULT STE. MARIE, Jan. 19, 1895.

Miscellaneous Mention.

Carkin, Stickney & Cram, dredging contractors, now have headquarters in the Grummond building, Detroit.

Marcia is the name that will probably be given to the second of the Minnesota Steamship Company's steel schooners, building at South Chicago.

Tonawanda tug owners, who, up to last year, had for several years agreed on towing rates, are now at variance with one another and low rates are expected for next season. The trouble was started by a couple of outside tugs competing for a share of the business last season.

A Chicago company is the latest to talk of trying to raise the steamer Pewabic, lost on Lake Huron. Capt. George P. McKay of Cleveland, who was in command of the boat, has received a communication from the A. P. Pichereau Company of No. 173 Randolph street, Chicago, asking for all manner of information about the accident and the probable location of the wreck.

A Buffalo vessel owner who attended the annual meeting of the Lake Carriers' Association in Detroit, and who is very well posted on affairs of the package freight lines, made the statement in open meeting that not one of the Buffalo lines had made money last season. It would seem that the statement was all right, as the line managers are considering, more than ever this winter, the matter of reducing shore expenses.

Following are the directors of the Republic Iron Company elected in Cleveland a few days ago: H. B. Perkins, Peter White, W. D. Rees, G. W. R. Matteson, Samuel Mather, J. V. Painter, W. F. Dummer, A. Hart, N. M. Kaufman. W. D. Rees was elected president and treasurer, H. B. Perkins, vice president, W. B. Castle, secretary, and Douglas Perkins, auditor. A dividend of 50 cents a share was declared, payable Jan. 26. There are 100,000 shares of a par value of \$25 a share.

Lake Charts—Conflict Between Army and Navy Officers.

In last week's issue of the REVIEW, there was printed from Ensign W. L. Cole, naval officer in charge of the branch hydrographic office at Cleveland, a communication in support of efforts of the hydrographic service to establish additional branch offices on the lakes, and more particularly to secure appropriations sufficient to enable the service to carry out on a big scale the publication of charts covering the entire chain of lakes, for this is the aim of Commander Sigsbee, the chief of the service, who has suggested that the government build vessels for survey purposes and otherwise undertake matters that would involve considerable expense. During his short term of service here, Mr. Cole has proven himself an ambitious and efficient young officer. He is rapidly making the acquaintance and acquiring the good will of vessel owners and masters, not only in Cleveland but in other places, and it is natural that he should write very earnestly in support of the aims of his superior officers. But in this matter of new charts, as well as in other work undertaken by the hydrographic service, there is a conflict with other departments, especially the engineer corps of the army and the district officers of the light-house board, and a duplication of work that can not consistently be encouraged by the shipping interests.

For years past the engineer corps has had charge of all charts and correction of charts on the lakes. Their work has been very satisfactory, and it would be even more satisfactory if appropriations of late were sufficient to enable them to carry out more rapidly improvements in the charts that have been under way during the past two or three years. An item in the civil sundry appropriation bill now before congress provides \$50,000 for "surveys and other expenses connected with correcting and extending charts." This item, alike to similar items in civil sundry bills in past year, has the support of the vessel interests, for the reason that it is well understood that the money is carefully expended for the improvement and the revision of charts under the direction of General Poe of Detroit. Now it is certain the bulk of the work that the several hydrographic offices (established and proposed) appear to be endeavoring to do—certainly the lion's share of it as far as appropriations and expenditures are concerned—is surveying pure and simple. There is one point that is quite clear in this whole matter, and that is that, if the general surveying needed on the lakes is done in co-operation with the surveys that must always be made, year after year, in connection with river and harbor improvements, duplication such as occurred at Chicago in 1892 and Detroit river in 1894, would be entirely avoided. And after all, where is there any great amount of surveying needed, excepting in rivers and harbors and in the connecting channels where river and harbor improvements are being made. In these places the argument of the naval officers that the man who uses a chart is the one who knows most about making it will not hold good, any more than would the claim that the man who uses a canal lock is the one who knows most about building it. If an obstruction is found now, whether in the channels or around the islands in open lake, it is buoyed by officers of the light-house board and, if deemed advisable, it is removed as soon as possible under the direction of the engineers. Losses from the finding of new shoals or obstructions of any kind by vessels have not, by any means, been sufficient to warrant the expenditure that would be involved in a general hydrographic survey. The work of the engineers as regards all matters here referred to is complete and eminently satisfactory, and the vessel owners indicated their desire to let well enough alone when, at their annual meeting in Detroit on the 8th inst., they refused to interfere in the matter by passing over, without consideration, a resolution endorsing the plans of the hydrographic service.

Tips From the Man on the Dock.

"Who is C. H. Keep? Does he own any vessel property? What line does he represent in Buffalo?" I heard these and similar questions at the joint meeting of vessel owners and masters in Cleveland a few days ago. The queries were mostly from the masters, but even among many of the Lake Carriers Mr. Keep is not well known, although he has been secretary of the association since its organization. He does not seek acquaintance. He is not a vessel owner. He is a lawyer. He manages no line of ships in Buffalo nor anywhere else, but he has the confidence and support of the line managers of Buffalo, and he represents to a large extent their interests in the association. He is a power in the organization on this account, but his merits as a secretary do not rest with the Buffalo influence which he represents, and which, by the way, derives little benefit from the shipping offices. Mr. Keep's salary from the association is \$2,000 a year. The amount has been referred to in the past as liberal for the position of secretary, but the criticism was not from active officers of the association who understand the kind of work involved in the office; the high character of correspondence and all manner of dealings with senators, congressmen and heads of government departments, that has brought recognition to the association in Washington. Mr. Keep's matter-of-fact disposition is not of the kind that brings admirers in a hurry, but it is certain that great difficulty would be found in securing a secre-

tary of his ability to give up even as much time as he devotes to the office. He earns his salary with the association and finds some time to devote to a private law business.

In all big gatherings like the recent annual meeting of the association of lake vessel owners the duty of leading in important action on troublesome questions that involve extended discussion is finally left to some two or three members, and often to a single member who has the confidence of the general body. This was the case at the Detroit meeting, when the retiring president, Mr. James Corrigan of Cleveland, presented to the association his views on the question of abuses in the fueling business, with an urgent request that a strenuous effort be made to stamp out the evil as far as it was possible to do so. Mr. Corrigan had himself determined upon securing action by the vessel owners with reference to the matter, but the complication of interests brought out in the general discussion of the subject was so great that a settlement upon any plan of action seemed absolutely impossible. Harvey D. Goulder, counsel of the association and the legal adviser of most of its leading members, was the Moses in this instance, as he has been on many similar occasions. He worked with committees—sometimes with two or three of them in session in different parts of the Cadillac at the same hour—and drafted the resolutions in which it was agreed that different plans of action should be agreed upon to cover conditions at Buffalo that were not the same as those prevailing at Ohio ports. The iron-clad legally-worded agreements that followed the adoption of the resolutions were also of his preparation. What will come of this action with all the care that attended it remains to be seen. The agreements contained sufficient detail to cover all possible contingencies, and if lived up to with the same care that characterized their preparation there can be no doubt of the result.

In referring to towing business on the lakes, Wm. Livingstone, Jr., the newly elected president of the Lake Carriers' Association, advanced the opinion, when in Cleveland a few days ago, that we are to see quite a return to tows behind big steamers. Mr. Livingstone probably based this opinion on the action of one of the ore companies that is having two steel tow barges built in South Chicago this winter, but he added that the question just now is: "What will move the largest amount of tonnage on the lowest cost?" and as though he had himself given this question some study he was quite positive in saying that the number of large towing vessels to be built shortly will be surprising. Mr. Livingstone makes a very good presiding officer. His fitness in this regard was demonstrated at the Cleveland meeting of owners and masters on Saturday last. The vessel owners have made no mistake in selecting him for the presidency of their association. He was a member of the old Lake Carriers' Association—the Buffalo organization—and has always been active in securing legislation of advantage to the vessel interests. He has been interested in vessel property for many years and is now proprietor of the Journal, one of the leading daily newspapers of Detroit. His name is always connected with public enterprises in Detroit. His services to that city on the park and boulevard commission and in other capacities have always been of a public-spirited kind that has given him a favorable reputation throughout the state among men who will, on his account, be of service to the association.

At one of the Cleveland meetings of vessel men called to discuss the proposed changes in pilot rules, it was stated that Capt. Shackford of New York, one of the American delegates to the International Marine Conference, had, in support of the new rules, referred to the great variety of sounds in the Morse telegraph alphabet and intimated that vessel masters might be expected to learn and use a system of sounds that was a great modification of the Morse system. "Capt. Shackford's theories may be all right," said one of the captains, "but if the telegraph operator was sitting with his instrument near a window, and some fellow across the street was going to throw a brick at him, he would be very liable to forget his alphabet."

Two Fog Signals and a Light.

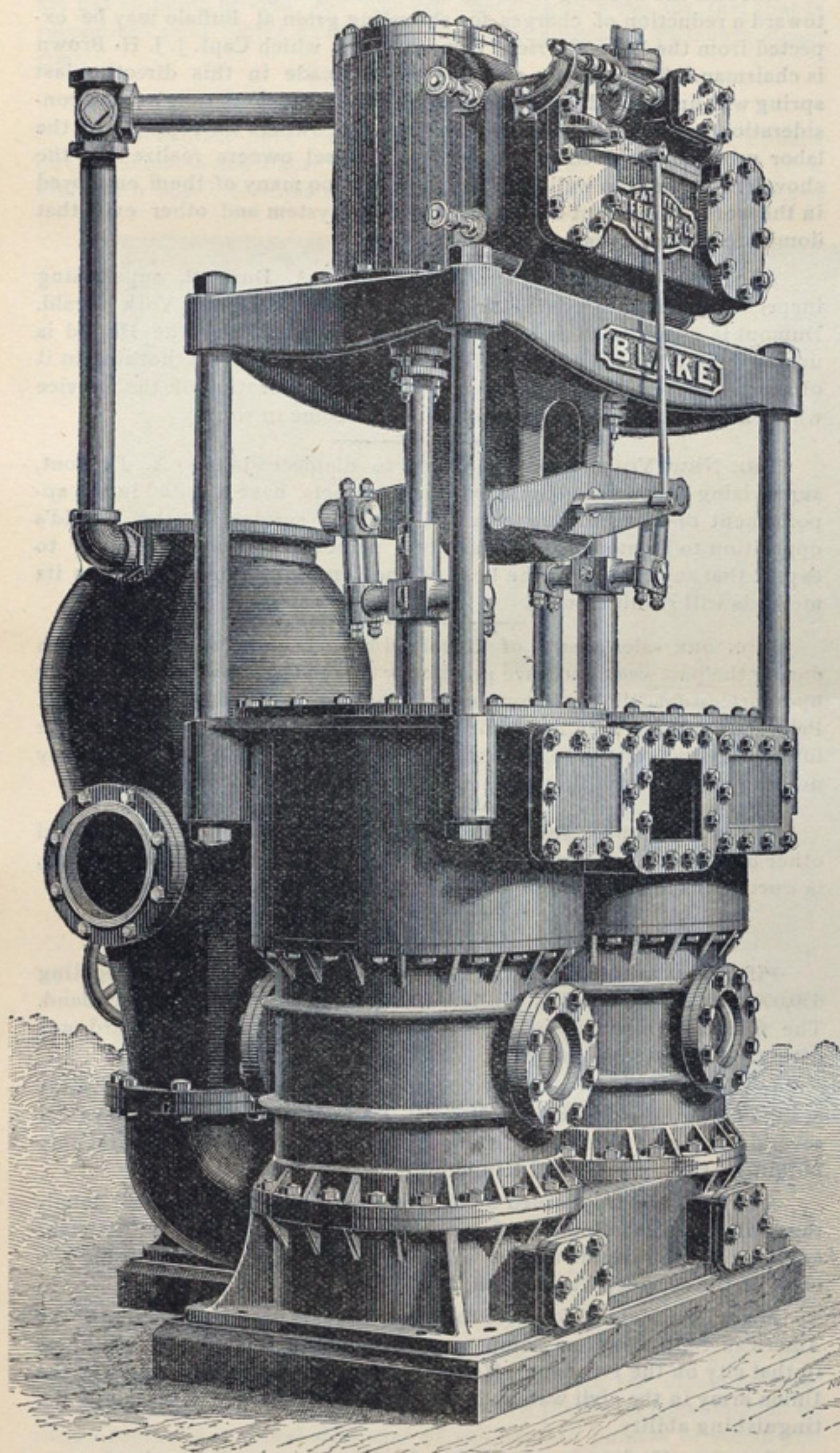
Ten-inch steam fog whistles has been erected at Kewaunee, Wis., and Ludington, Mich., and they are now in operation for the benefit of vessels engaged in winter traffic on Lake Michigan. Blasts of three seconds duration separated by silent intervals of eleven seconds are sounded at both ports. These signals will, of course, be in operation throughout next season.

Wm. Smith, Canadian deputy minister of marine has published an official notice regarding the light-house tower at the turn of the dredged channel in Collingwood harbor, which was completed towards the close of last season. The light is of the fixed red kind. Vessels making the harbor from the westward should keep about half a mile off shore until this light opens a little to the eastward of the light on the extremity of the west breakwater, when they should haul for the former, leaving the breakwater light 250 feet distant on the starboard hand in passing. They should also leave the harbor light on the starboard hand in entering.

Blake Vertical Twin Air Pump and Jet Condenser.

In a previous issue the REVIEW has referred to the Blake vertical twin air pump as used in connection with surface condensers on United States naval vessels like the Columbia and Minneapolis, and called attention to their economy. This in the case of the Minneapolis was reported as low as one-sixth of one per cent. of the total power developed by the main engines. The accompanying cut shows this same type of vertical twin air pump in connection with the Blake automatic jet condenser. This arrangement is especially adapted for use with stationary engines in electric light and power plants. The machine occupies very little floor space.

Each air cylinder is single-acting, and by combining two, the steady effect of a double-acting pump is produced. The air buckets have a large number of small disc valves that are more efficient, and the aggregate area



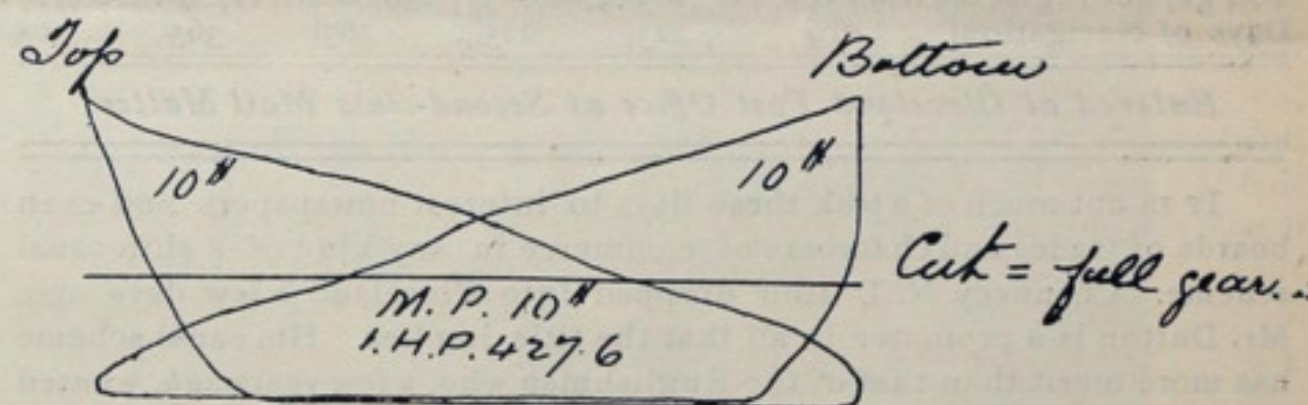
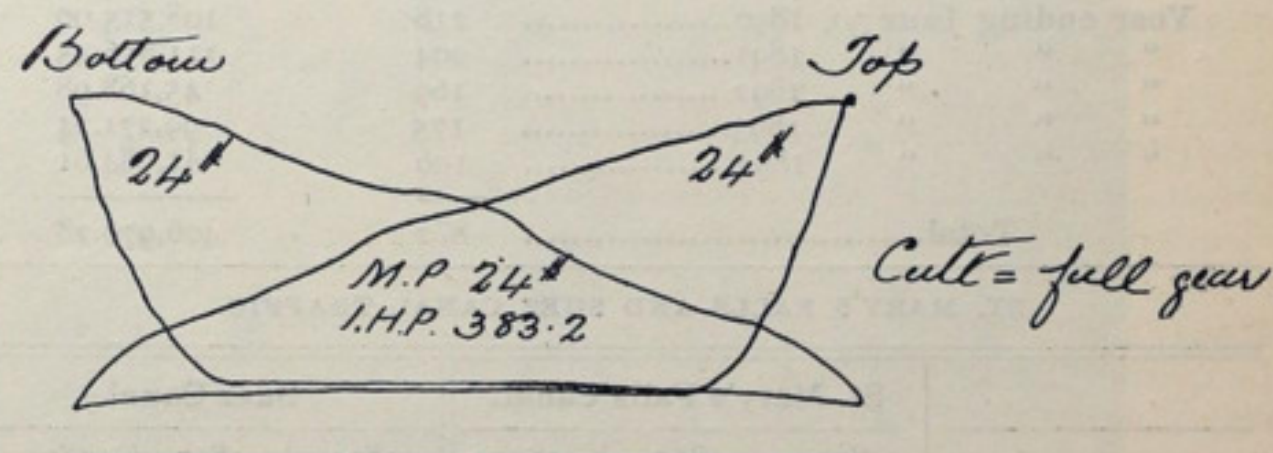
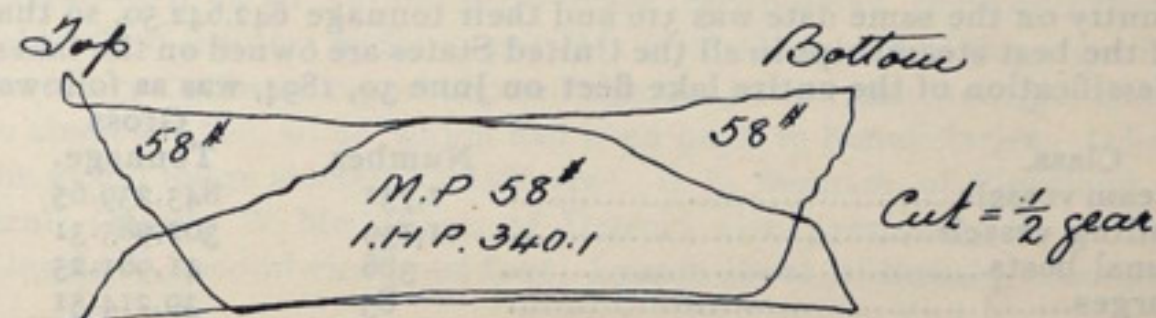
of which is larger than one heavy clumsy valve. A feature of the pump is the arrangement of the valve gear, which is perfectly adjustable even while running, shortening or lengthening the stroke at will. The condenser is provided with a patented vacuum breaking attachment which is not shown in the cut, as it is hidden by air pump. This consists of a hollow copper float, which raises a small air valve from its seat and allows the air to enter the condenser and break the vacuum in case the accumulation of condensing water rises above a safe height, thus preventing any possibility of the water backing up in the exhaust pipe and cylinder of the main engine. There is a three-way cock in the exhaust pipe of these air pumps to direct the steam either into the condenser, an auxiliary feed water heater, or into the receiver of the main engine, if of the compound or triple type.

Test of the Steamer Pioneer.

Following are the principal items reported as results of a test made by Robert Logan of Cleveland on the steel freight steamer Pioneer, built by the Detroit Dry Dock Company and owned by the Cleveland-Cliffs Iron Company of Cleveland. The Pioneer is a steamer of 775 net tons and is fitted with triple expansion engines having cylinders 20, 33 and 54 inches

Indicator Cards
S. S. Pioneer

Vessel loaded. 29th Oct. '94



diameter with a stroke of 42 inches. She has two Scotch boilers fitted with Howden's hot draft. The indicator diagrams were taken in connection with the test of the vessel while loaded:

	VESSEL, LIGHT.	VESSEL, LOADED.
Date.....	Oct. 25, '94.	Oct. 29, '94.
Indicated horse power, H. P. Cylinder.....	284.35	340.1
Indicated horse power, I. P. Cylinder.....	274.32	283.2
Indicated horse power, L. P. Cylinder.....	264.28	427.6
Totals.....	822.95	1,150.9
Mean pressure in pounds, H. P. Cylinder.....	53.0	58.0
Mean pressure in pounds, I. P. Cylinder.....	18.9	24.0
Mean Pressure in pounds, L. P. Cylinder.....	6.8	10.0
Equivalent mean pressure.....	21.13	26.95
Revolutions per minute.....	80	88
Piston speed per minute, in feet.....	560	616
Vacuum in inches.....	20	19
Boiler pressure in pounds.....	165	165
Consumption of steam in pounds per I. H. P....	11.77	14.29
I. H. P. per square foot of grate surface.....	9.88	13.86
Square feet of heating surface per I. H. P.....	3.77	2.687
Average revolutions, Ft. Gratiot to Detour.....	79.75	79.25
Average speed in miles, Ft. Gratiot to Detour...	14.00	12.85
Average slip of propeller, per cent.....	-4.8	+5.5
Coal per I. H. P. per hour in pounds.....	2.00	2.21
Coal per square foot of grate surface, pounds....	22.10	28.05

Fan engine revolutions, 188; air pressure, 1.5 inches. Fan engine air pressure in furnace, 0.625 inches and 0.5 inches.

Temperatures—Feed, 120 degrees; lake, 41 degrees.

Temperatures—Atmosphere, 56 degrees; firehold, 94 degrees to 110 degrees.

Barometer, 28.875.

Fuel used was slack coal.



DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O.

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,341 vessels, of 1,227,400.72 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons and over that amount on the lakes on June 30, 1894, was 359 and their aggregate gross tonnage 634,467.84; the number of vessels of this class owned in all other parts of the country on the same date was 316 and their tonnage 642,642.50, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1894, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels.....	1,731	843,239.65
Sailing vessels.....	1,139	302,985.31
Canal boats.....	386	41,961.25
Barges.....	85	39,214.51
Total.....	3,341	1,227,400.72

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30,	Number.	Net Tonnage.
1890.....	218	108,515.00
" " " 1891.....	204	111,856.45
" " " 1892.....	169	45,168.98
" " " 1893.....	175	99,271.24
" " " 1894.....	106	41,984.61
Total.....	872	406,976.28

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

	St. Mary's Falls Canal.			Suez Canal.		
	1893.	1892.	1891.	1893.	1892.	1891.
No. vessel passages	12,008	12,580	10,191	3,341	3,559	4,207
Ton'ge, net regist'd	9,849,754	10,647,203	8,400,685	7,659,068	7,712,028	8,698,777
Days of Navigation	219	223	225	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

IT is not much of a task these days to interest newspapers and even boards of trades and chambers of commerce in any kind of a ship-canal scheme. Chauncey N. Dutton dropped into Cleveland a few days ago. Mr. Dutton is a promoter in all that the title implies. His canal scheme has more merit than that of the Englishman who, a few years ago, wanted Russell Sage to furnish money for the construction of a pipe line, through which he proposed to pump milk from the dairy districts around Utica to the merchants of New York city. But the newspaper stories of immediate action being taken in Washington to carry out Mr. Dutton's project are about on a par with reports that New York capitalists were seriously thinking of joining the English promoter in his proposed monopoly of milk business. Mr. Dutton was in Cleveland to interview wealthy and influential men who might possibly allow their names to be used as incorporators of the Maritime Canal of North America. In April of last year the Canadian parliament granted a charter of some kind to the North American Canal Company, for the construction of a system of canals, which, on paper, were to doubly exceed in magnitude the St. Lawrence system and, of course, supplant the dominion system, if there was anything serious about the charter. From the St. Lawrence, this great new waterway was to run on to the Hudson river by way of Lake St. Francis and Lake Champlain. It was a project involving more millions than the Canadian government has been able to command in all the years devoted to its canal interests, and yet Mr. Dutton, apparently alone, secured some kind of a charter. Now he is on his way to Washington with a new name selected for an American company, and he says he will get a charter for the New York state part of the project without any difficulty, as congress wants to get away from the financial question and will take up anything to occupy time before adjournment. No mystery attaches to methods used by Mr. Dutton and men of his kind in gaining newspaper notices. They have only to be good talkers, fairly well posted on popular subjects that they present, but where do they in this enlightened age, and with the additional disadvantage of hard times, find money enough to pay traveling expenses, live at first class hotels, dine with distinguished men and at all times make a presentable showing?

NATIONAL PRESIDENT George Uhler of the Marine Engineers' Beneficial Association a short time ago addressed to the treasury department

a short letter of inquiry that was evidently intended to secure from the department, in a shrewd way, a ruling as to whether engineers are officers of American vessels. Mr. Uhler wished to know whether licensed engineers of steam vessels are "subject to the provisions of circulars and other official papers and documents emanating from the treasury department of the United States and addressed to licensed officers of steam vessels." The department answered that in all cases where engineers are directly referred to in such circulars all licensed marine engineers are bound by the terms of such circulars, so far as may be applicable to such engineers, but a direct answer to the question was evaded by the stereotyped statement that it is contrary to the practice of the department to consider or decide questions of this kind unless an actual case should arise and all the facts are presented by parties in interest.

BEFORE the opening of navigation in the spring, some action tending toward a reduction of charges for shoveling grain at Buffalo may be expected from the Lake Carriers' committee, of which Capt. J. J. H. Brown is chairman. The success of a movement made in this direction last spring will undoubtedly prompt the elevator managers to give due consideration to any plan suggested by the vessel owners for coping with the labor problem involved in the subject. Vessel owners realize that the shovelers are not too well paid but there are too many of them employed in the work, on account of the boss-scooper system and other evils that dominate the business.

ANOTHER attempt to turn down James A. Dumont, supervising inspector-general of steam vessels, is being made by the New York Herald. Dumont is a politician and opposition of the kind that the Herald is urging against him is of the political kind, so that there is nothing in it of special interest to vessel owners, but a reorganization of the service which he represents is demanded and it will come in time.

THE NEW YORK Herald's efforts to displace James A. Dumont, supervising inspector-general of steam vessels, have resulted in the appointment of a committee to investigate the service, but the Herald's opposition to Dumont is too much of a personal and political affair to expect that any change in the head of the service or improvement in its methods will result from it.

IRON ORE sales agents of Cleveland have been in conference again during the past week and have practically concluded the work of agreeing upon prices for all Bessemer ores excepting those of Mesabi range. Prices which have been fixed for each ore according to its value in the furnace are understood to be based on \$2.90 for Norrie. There is certainly nothing radical about this price for a basis.

CHICAGO's plan for equipping ten of the harbor tugs with pumps and other fire-fighting apparatus, so as to make auxiliary fire boats of them, is worthy of the attention of city officials in other parts of the lakes.

In General.

Fifty years in the ship building business and 500 launches aggregating 660,000 tons is the record of William Denny & Sons, Dumbarton, Scotland. The fiftieth anniversary of the establishment of this ship yard was fittingly celebrated recently.

In point of tonnage produced, Harland & Wolff of Belfast, Sir W. Gray & Co. of West Hartlepool and Russell & Co. of Port Glasgow, have for several years past alternated in the distinctive position of the first ship building firm of the United Kingdom.

A circular recently issued by the treasury department gives all details regarding the examination of applicants for the position of assistant engineer in the revenue marine service. Copies may be had from the chief of the service, Washington, D. C.

Major Geo. Metcalf, for more than twenty years past the treasurer of the American Ship Windlass Company of Providence, R. I., died at his home in that city on the 14th inst. He is credited with gallant services in the Union army in the civil war, and was altogether regarded as a man of distinguishing ability.

Secretary Herbert is considering further plans to bring about complete harmony among bureau chiefs of the navy. He aims to have all matters pertaining to ship construction, including its machinery, armor and armament under one head. He now proposes to make the chief of the bureau of construction and repair responsible for the construction of all auxiliary machinery, including electrical apparatus for turrets and the design of turrets.

Fifteen armor makers from England, France, Australia, Germany, Russia and America competed for the contract that Lieut. Meigs, once an officer in the United States navy, brought back to the Bethlehem Iron Company from Russia a few days ago. Not only is an American battle ship now a strictly American institution, but more orders from foreign countries may be expected to follow the success of the Bethlehem company in this instance.

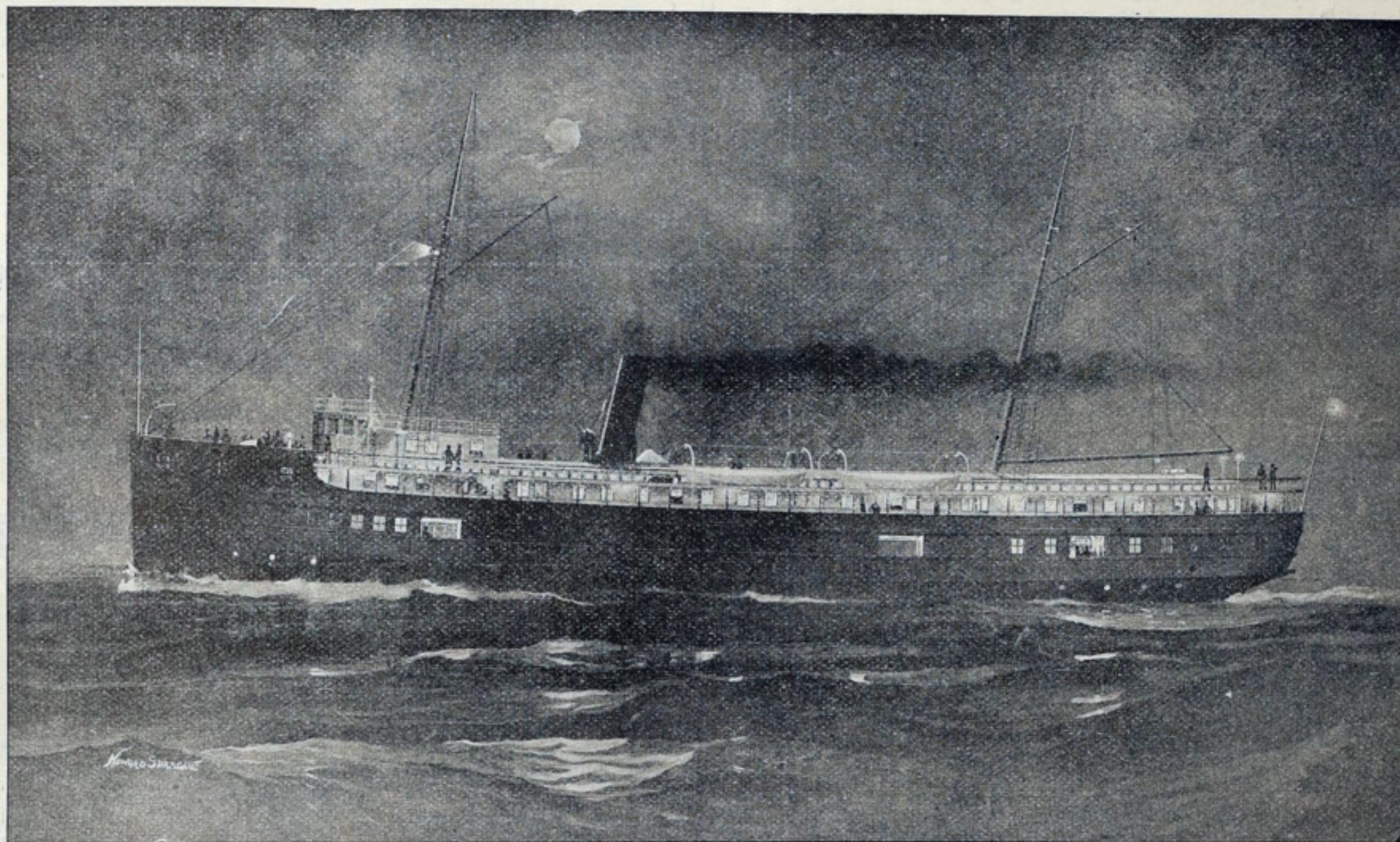
The Fuel Question.

Vice-President Corrigan and other Cleveland members of the Lake Carriers' Association, who have had in charge the agreements on the matter of prices of fuel for next season, which were drawn up at the annual meeting in Detroit, are encouraged by reports from different lake cities to the effect that the list of signatures secured at Detroit is being augmented by new names, wherever the agreements are presented to vessel owners. Mr. Corrigan has a letter from W. L. Scott & Co. of Erie, (Northwestern Fuel Company) saying that they will not permit the question of a vessel purchasing fuel from them to enter in any way into considerations attending charters, and that for such fuel as they do sell they will charge only a reasonable margin over cargo prices to cover extra cost of handling. A few contracts for amounts ranging from 3,000 to 10,000 tons have been made with vessel owners by Cleveland dealers who are not shippers of coal, and who are charging \$2 a ton for fuel that is recognized as of better quality than the best grades of Pittsburg steam coal.

Coal Burned on a Big Atlantic Liner.

No particulars have been published of coal burned on the Cunard liners *Campania* and *Lucania*. It is known that the *Paris* and *New York* each burn about 350 tons every twenty-four hours, and on the basis of

stitution at the Detroit meeting, the changes are largely matters of detail, the most important of them involving the right of the grand lodge to make changes and thus overcome the difficulty of having subordinate lodges meet early enough in December to submit recommendations to the general body that meets in January each year. Consideration of the question of pilot rules, regarding which it was finally decided to send representatives to Washington with a committee from the Lake Carriers' Association also took up a large part of the time of the convention. It is, of course, understood that membership has decreased considerably during the past year, and this subject was discussed at some length with the conclusion that the great aim of executive officers during the present year will be in the direction of improving membership. One important move in this direction suggested by the retiring president, Capt. Clark of Buffalo, and which had already been acted upon in the Cleveland lodge, was to the effect that the association, in view of the advantages offered by it to all shipping interests, recommend to owners that they select their masters as far as possible from the ranks of the organization. Secretary Collier's report showed that the endowment receipts amounted to about \$13,000, all of which had been paid to beneficiaries. Officers of the grand lodge elected for 1895 are: C. E. Benham, of Cleveland, president; George W. McCullagh, of Detroit, vice president; W. S. Mack, of Cleveland, second vice president; Lyman Hunt, of Buffalo, treasurer; W.



GRAHAM & MORTON LINE STEAMER CHICORA.

Missing and supposed to have foundered with twenty lives while engaged in winter navigation on Lake Michigan.

what is known about these ships a writer in *Cassier's Magazine* offers an approximation of the amount burned by the big Cunarders. Twenty-eight thousand horse power has been assumed to be the amount that the *Campania* and *Lucania* each require to propel them at the great speeds which they maintain. Added to this power of the main engines must be the appreciable figure represented by the host of auxiliary engines and pumps which are necessary adjuncts, and which, with the steam heating systems and hot water apparatus, help to swell the steam consumption to such a degree that a total allowance of, say, sixteen pounds of steam per hour for each of the twenty-eight thousand horse power may be taken as quite within the mark. Allowing, then, to a boiler performance of eight pounds of steam per pound of coal, which can not be far wrong, we have a coal consumption of two pounds per hour for each horse power, or 56,000 pounds, equivalent to 600 tons per day. If these figures are correct the advantage in speed that the British boats hold over the American liners would hardly seem to pay for such a great difference in coal consumption.

Shipmaster's Association.

Secretary W. A. Collier of the grand lodge, Shipmasters' Association, has begun the work of preparing, in connection with a report of the meeting held in Detroit last week, the constitution as revised at the meeting and also the usual list of members of the association with addresses and penant numbers. Although considerable time was given to the con-

A. Collier, of Cleveland, secretary; George A. Shaw, of Marine City, chaplain; Frank D. Welcome, of Buffalo, marshal; Robert Young, of Chicago, warden; W. E. Rice, of Port Huron, sentinel.

Pig Iron Production in 1894.

Although pig iron production throughout the United States during the first six months of 1894 amounted to only 2,717,983 gross tons, the production of the last six months of the year aggregated 3,939,405 tons, making the total 6,657,388 tons, against 6,489,738 tons in 1893. The 1894 product is the smallest for the past six years, which is, of course, due entirely to the light output during the early months of the year. Production of pig iron at present is at the rate of about 8,500,000 tons per year. Pennsylvania still leads the states, with Ohio second, Illinois third and Alabama fourth. These figures are from reports of the American Iron and Steel Association.

Man on the Dock.—"It must be rubbing the bristles the wrong way pretty hard for McDougall to build anything but a pig?"

Man off the dock.—"Wait till you see those oil barges come out. They may not have pig noses and backs but they will have pig anchors and other fittings so that the rest of the litter will grunt when they pass them. And may be you didn't know that a man named Haug designed them."

Man on the Dock.—"Yes, and I suppose they will carry hog loads?"

Man off the Dock.—"No, but they will carry hogs-heads of oil."

More Orders for Steam Towing Machines.

Capt. James Davidson of West Bay City has just ordered from the American Ship Windlass Company of Providence, R. I., one of the patent steam towing machines manufactured by that company. The machine will be used on the tow barge which Capt. Davidson is building at West Bay City. It would seem that this machine has now been as fully tested as it is possible to test any machine, and its adoption in lake business, to which it is particularly adapted, should be quite general, but innovations in methods of operating ships are of necessity brought about with great care and consequent delay. Another season will, however, see this machine in use on so many boats here that there is little doubt of the general adoption of it. Capt. Davidson's endorsement of it is important on account of his acknowledged shrewdness in matters of this kind and his practical knowledge of both the ship building and ship operating business.

The fact that the machine has been in use on the Boston Tow Boat Company's steamers Orion and Saturn for four years would of itself be sufficient to satisfy any one who had any doubts on the subject of its practicability, but the further test of two years on the steamer Aurora of Cleveland is special proof of its merits for lake service. The two machines ordered by Mr. H. G. Dalton of the Minnesota Steamship Company, Cleveland, for the steel tow barges building for that company at South Chicago have been shipped to the South Chicago yard. Mr. W. I. Babcock of the ship building company and Mr. Dalton were both afforded full opportunity to observe the workings of the machine on the Aurora in lake

or more thin edged ductile metallic strips of lenticular cross section, combined with planks, having kerfs formed in their opposite edges by cutting and compression of the wood laterally on the sides of the kerf without removal of said wood, said planks being pressed together with said metallic strip or strips inserted in said kerfs, with the wood of said kerfs pressing laterally against the sides of said metallic strips with a plastic cement interposed between the contiguous wood surfaces.

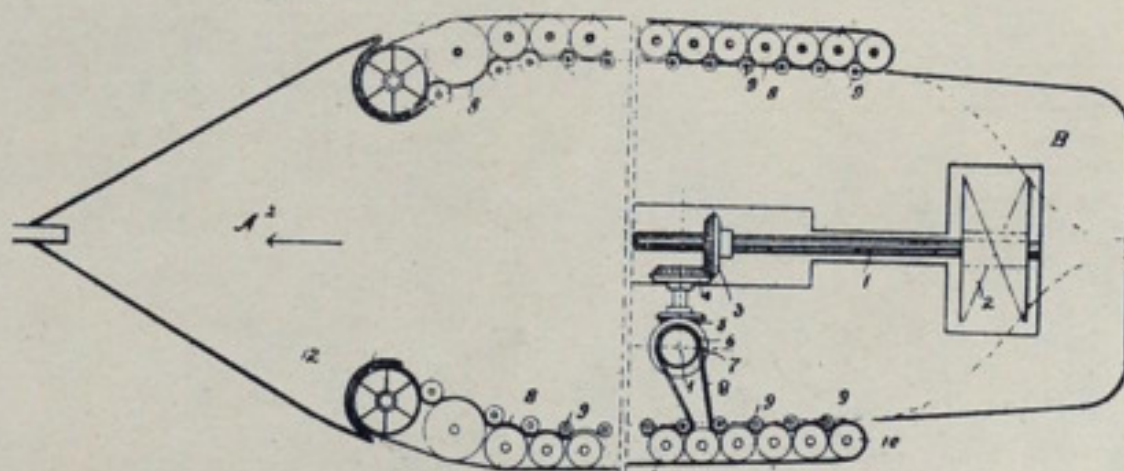
532,221. Means for Reducing Friction Between Ships and Water. John Thomas, Philadelphia, Pa. Filed Feb. 3, 1894. Serial No. 498,960.

Claim. The combination, as a means to reduce friction between the sides of a ship and the water, of a propeller shaft, a series of laterally disposed rotating cylinders with their axes parallel and arranged in vertical groups, each group having its component cylinders connected by universal joints and the entire series of cylinders adapted to come in direct contact with the water, a connecting mechanism between the said propeller shaft and the cylinders aforesaid.

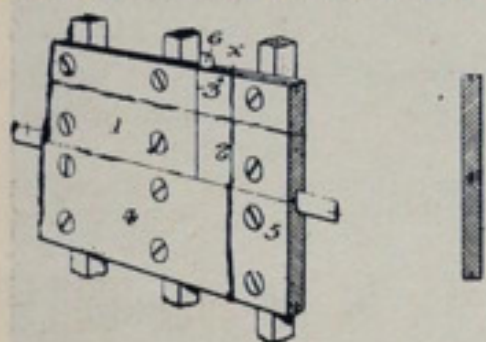
532,493. Propeller. Alexander Swerintzneff-Kusminsky, Chicago, Ill. Filed Oct. 27, 1893. Serial No. 489,265.

Claim. A propeller comprising a hub, a plurality of blades the line of contact of each of which with the hub is spiral relative to the longitudinal axis of the hub, and also approximately parallel with the line of contact of the next adjacent blade with the hub, the outer margins of the blades being segmental and disposed in a common plane transversely to the axis of the hub, so as to collectively describe a circle of which said axis is the center; the entering edge of each blade being coin-

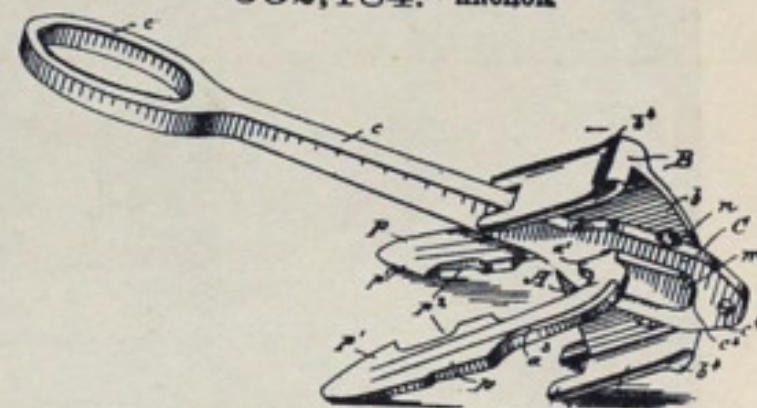
532,221 MEANS FOR REDUCING FRICTION



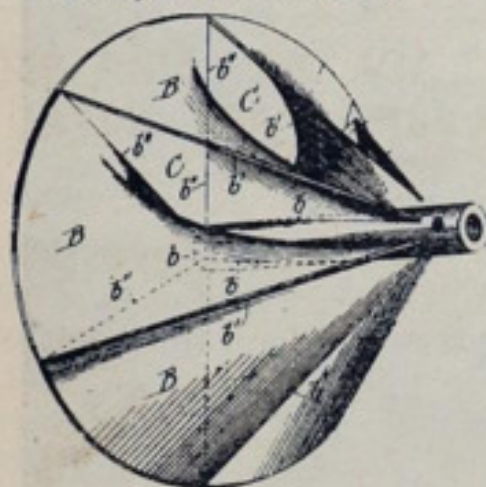
531,737. CALKING PLANKING OF BOATS, &c.



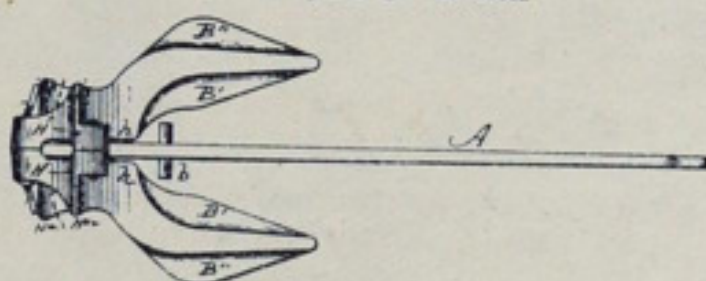
532,184. ANCHOR



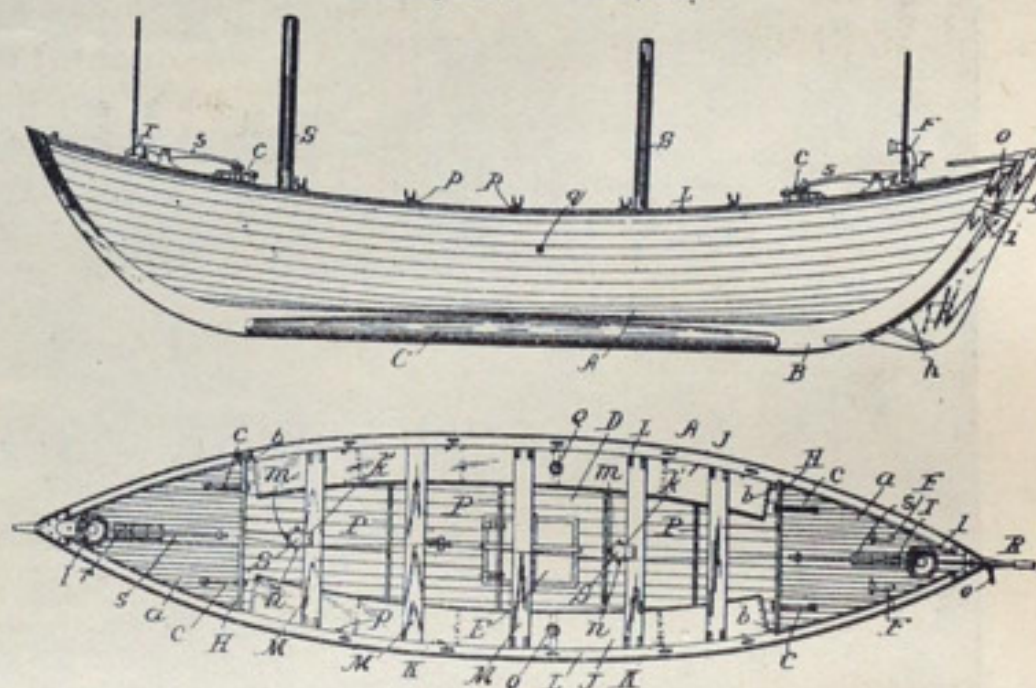
532,493. PROPELLER



532,606 ANCHOR



532,627 LIFE-BOAT



cident with the discharge edge of the next adjacent blade, and each two adjacent blades being separated by a laterally convoluted space triangular in cross-section and opening at the front and rear of the propeller, and the outer termini of the adjacent entering and discharge edges of each pair of blades being in actual contact with each other.

532,184. Anchor. Emil Rettig, Brooklyn, N. Y. Filed Apr. 13, 1894. Serial No. 507,382.

Claim. In an anchor, a central body A carrying arms provided with wide palms and lugs, in combination with a head B, firmly connected therewith, and a shank C, having the loop c' shoulder c^2 and slot c^3 rotatably connected with said body A. and journal-block m , locking the parts together.

532,606. Anchor. Clinton Sproat, Taunton, Mass. Filed Sep. 25, 1894. Serial No. 524,050.

Claim. An anchor having flukes provided with the heads constructed with the projecting corners $H H'$, connected by the concave or depressed webs H'' and the protuberating corners H''' , said heads being recessed on their sides at L and said flukes being pivotally secured to the shank.

532,627. Life Boat. Magnus A. Anderson, Hoboken, N. J. Filed Oct. 6, 1893. Serial No. 487,347.

Claim. In combination with the hull of a life boat, a deck extending from side to side thereof and dividing the boat into an upper and a lower compartment, housings above said deck, extending along each side of the boat, and independent air tanks located within the housings, said housings being covered over to retain the air tanks and form seats.

service, and Mr. Dalton took the additional precaution of calling on the managers of the Boston Tow Boat Company with reference to the matter when in the east some time ago. The order for machines for the Chicago built boats was the result of these investigations.

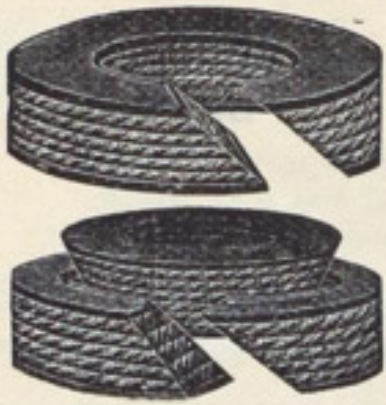
Mr. John Corrigan of Cleveland, managing owner of the Aurora, says that the machine will pay for itself every two years, and that the saving in hawsers is only one of the many advantages which it has. Capt. James Davidson says he is satisfied that this claim of saving by the use of the machine is correct. Mr. Corrigan says also that the officers of the Aurora report to him that one of the greatest advantages of the machine is in the readiness with which it enables them to make turns in places like the Sault river, with none of the annoyances, expense and delays caused by the breakage of tow lines and the tow going aground.

If the times are hard and freights are low, these are additional reasons why the most economical methods should be adopted for towing, and if the steam towing machine will pay for itself every two years, it would seem that no better investment could be made by any one engaged in the towing business than the adoption of the machine. The manufacturers are negotiating for machines with other owners on the lakes as well as parties in San Francisco, New York and Great Britain.

Illustrated Patent Record.

531,737. Calking Planking of Boats, etc. Thomas McBride, Philadelphia, Pa., and Ebenezer Fisher, Goderich, Canada. Filed July 17, 1893. Serial No. 480,781.

Claim: An improved fluid tight joint for planking, consisting of one



GARLOCK PACKINGS.

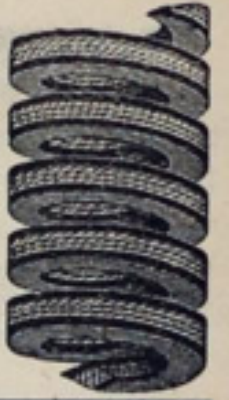
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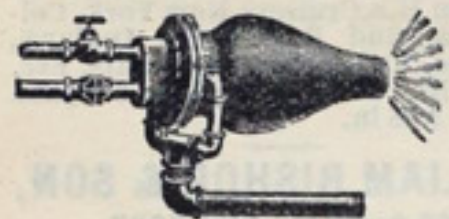
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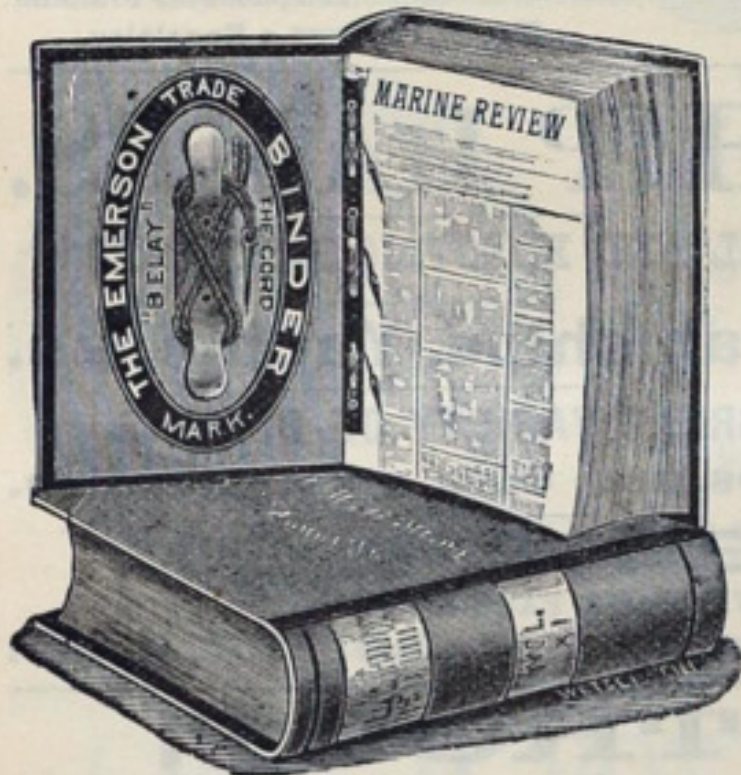
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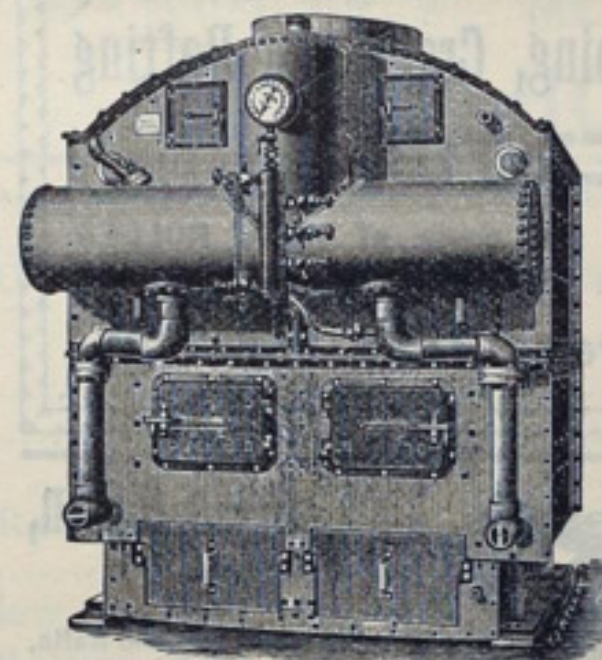
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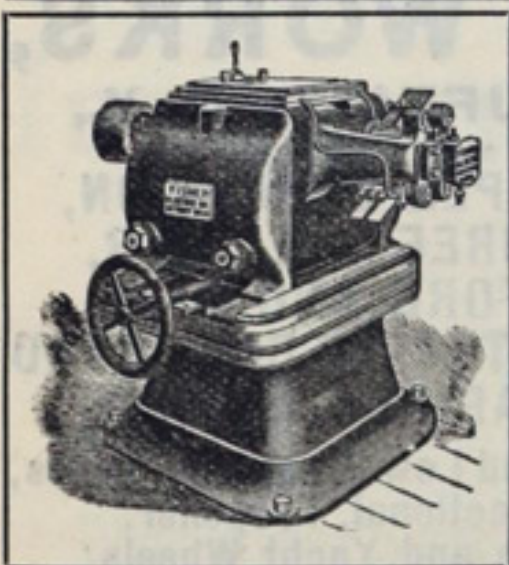
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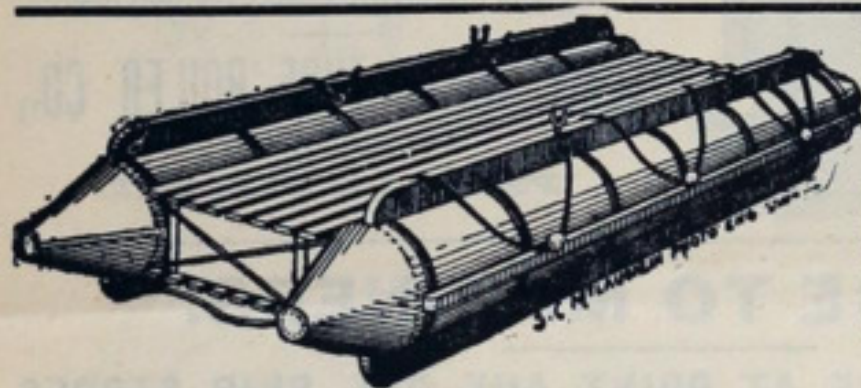
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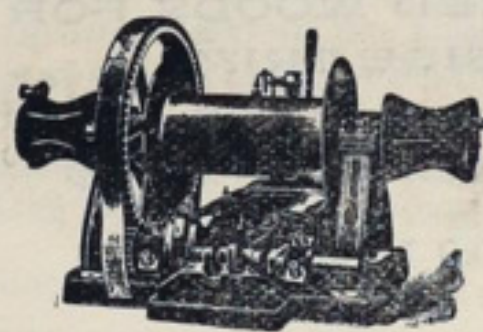
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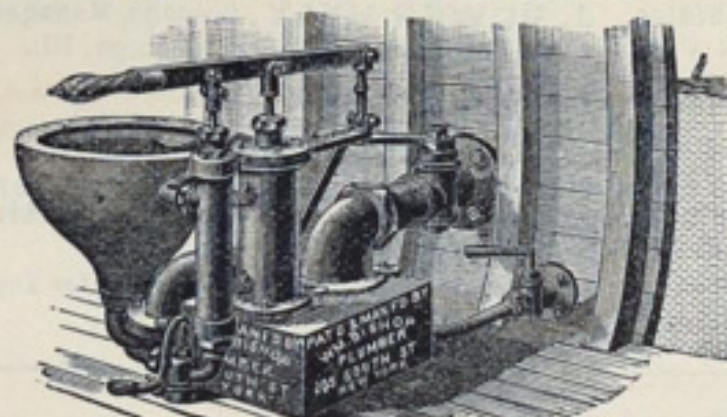
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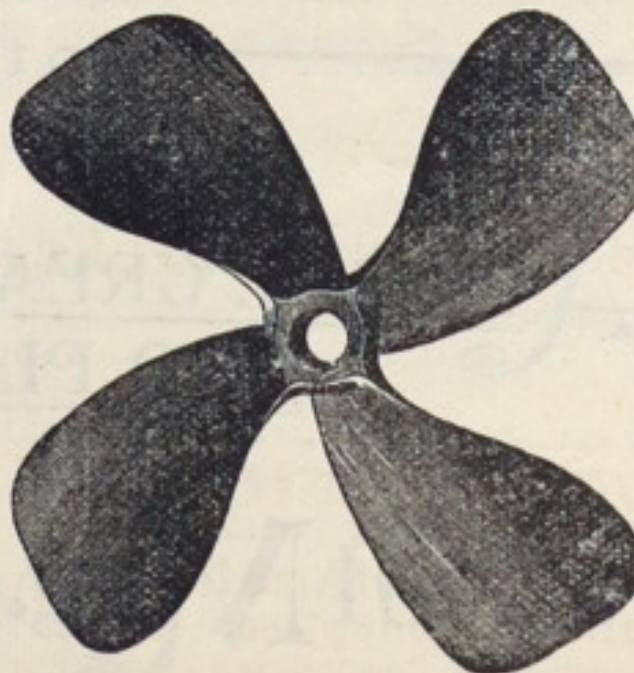
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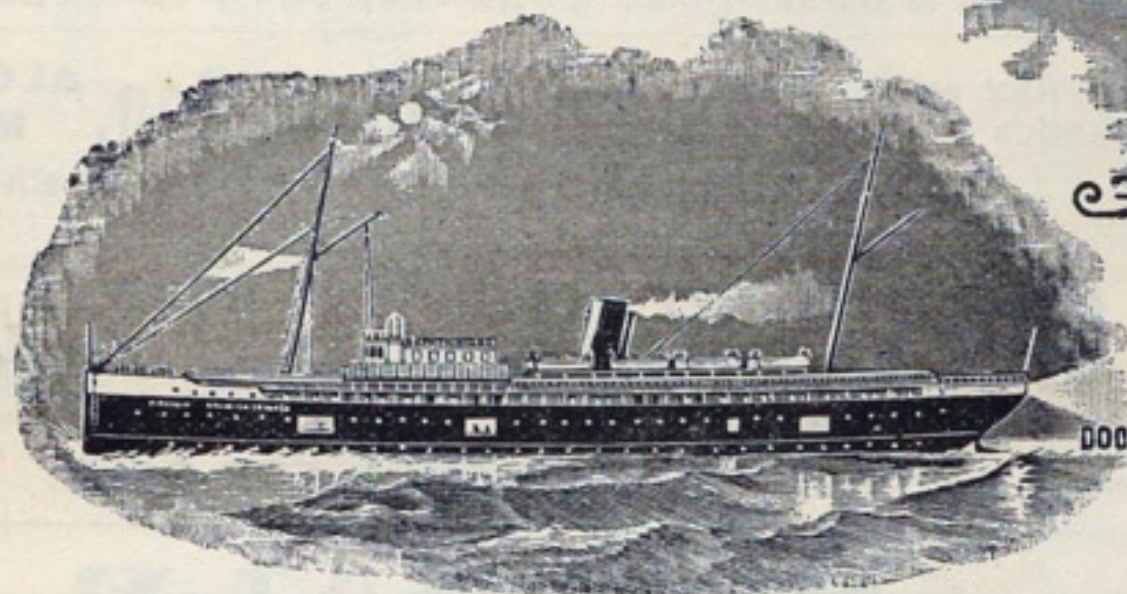
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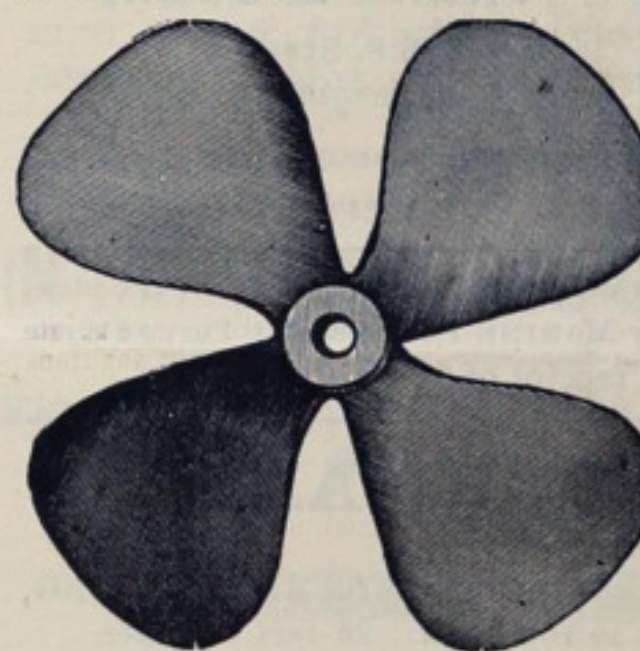
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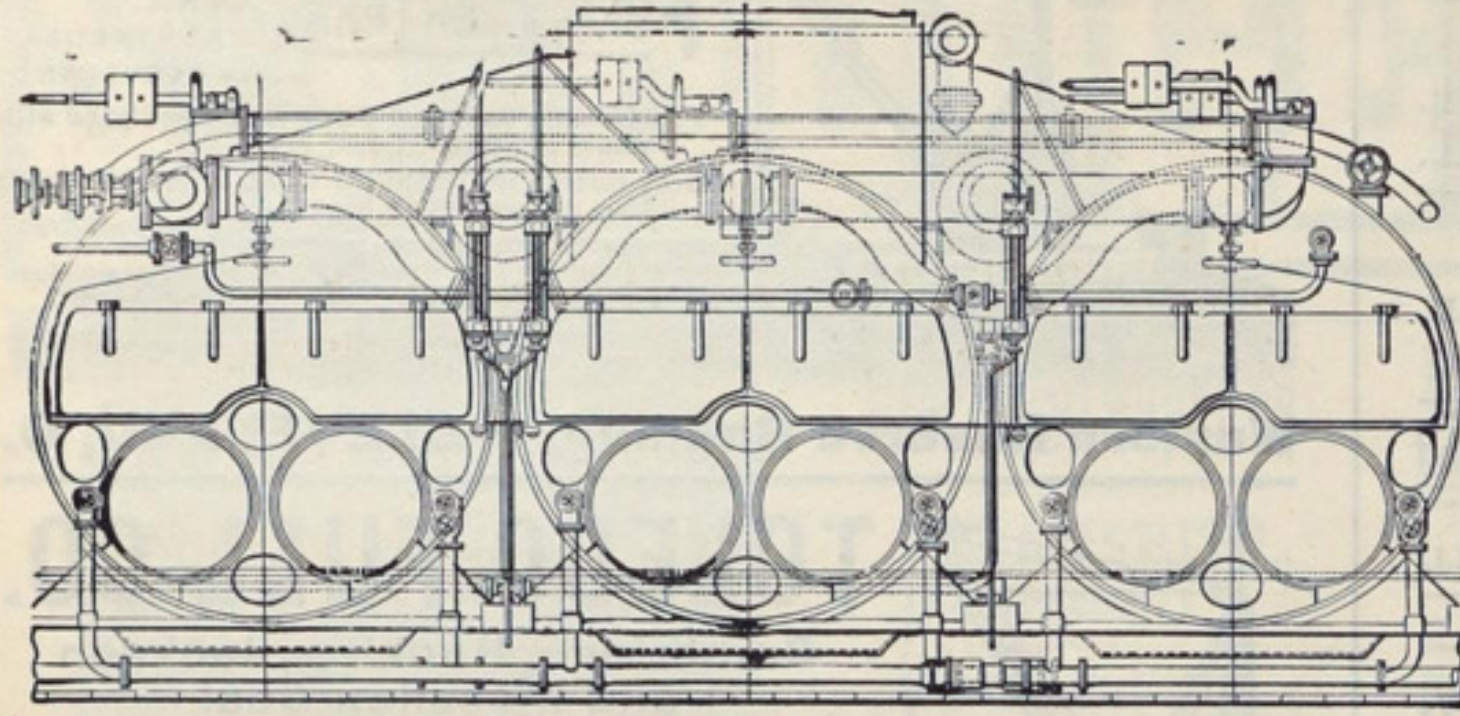
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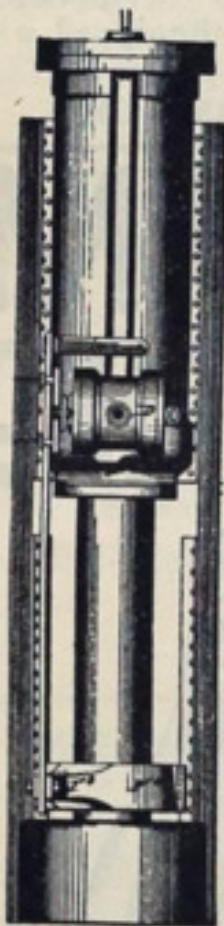
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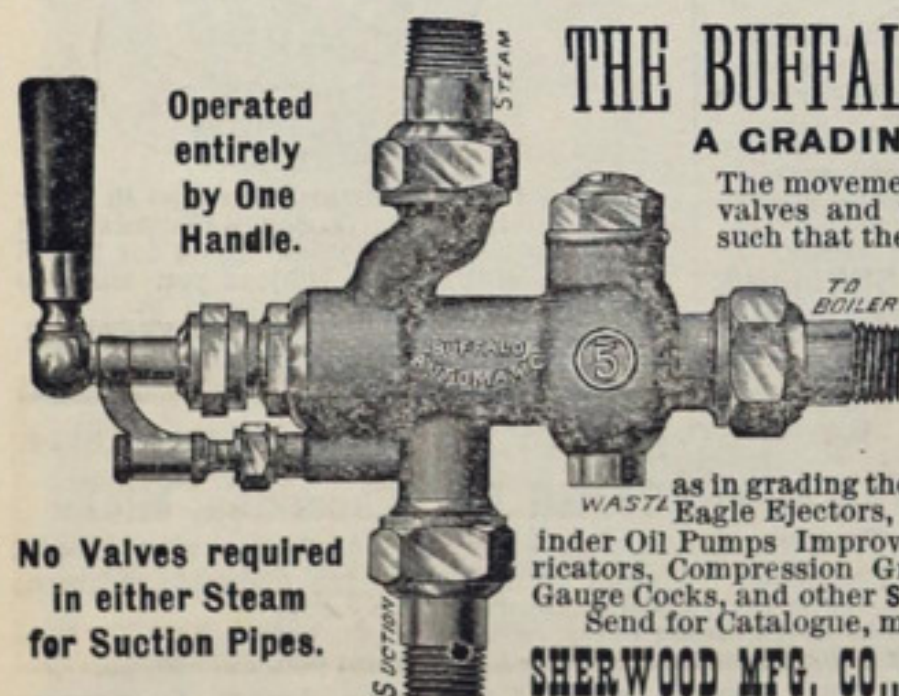
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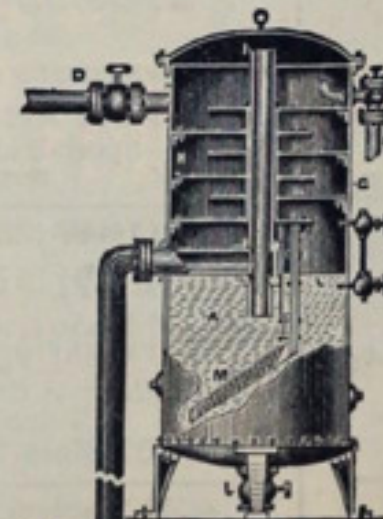
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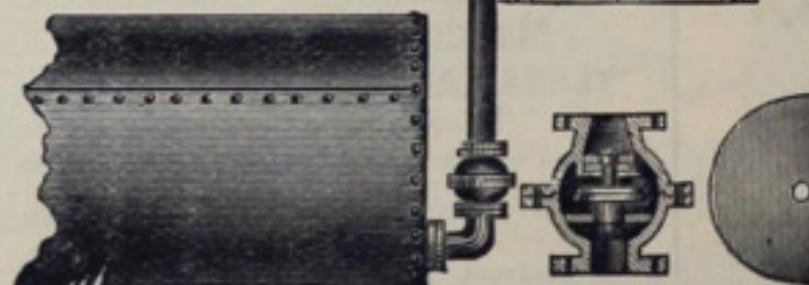
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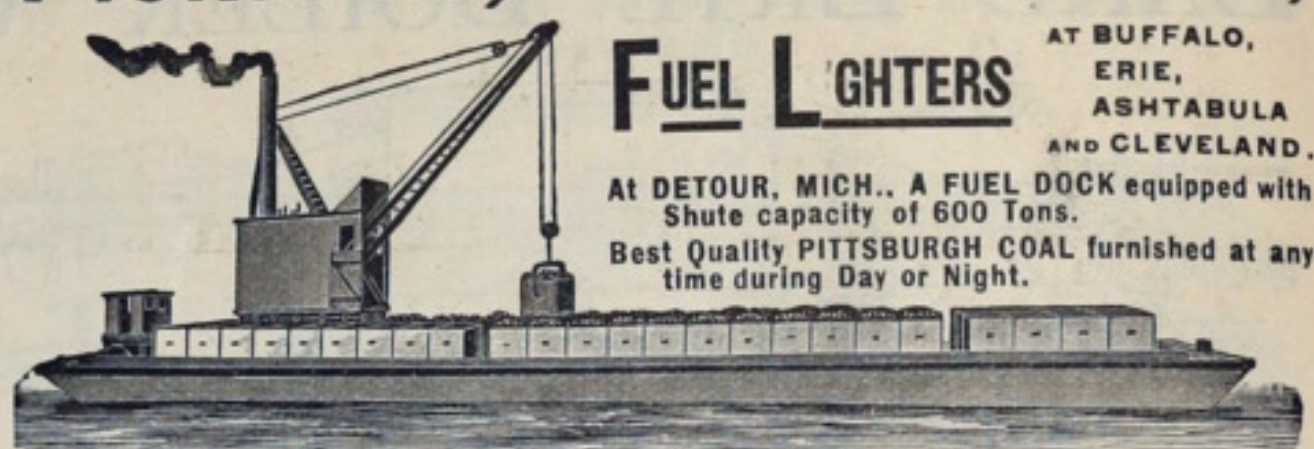
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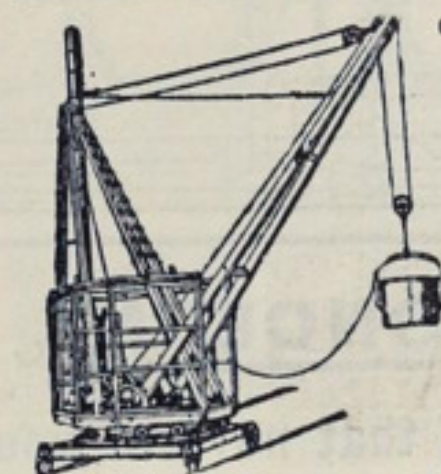


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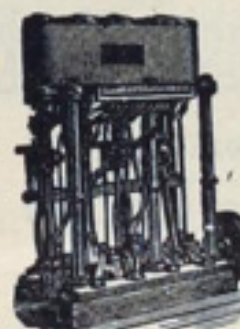
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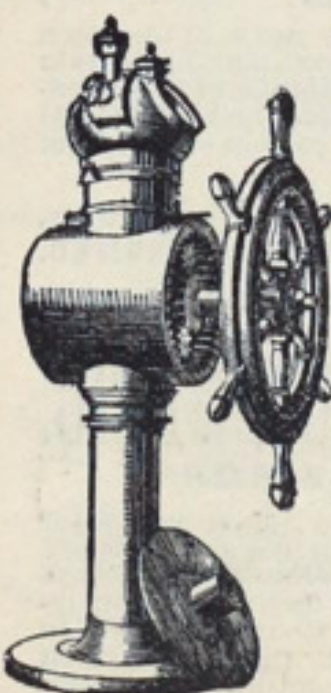
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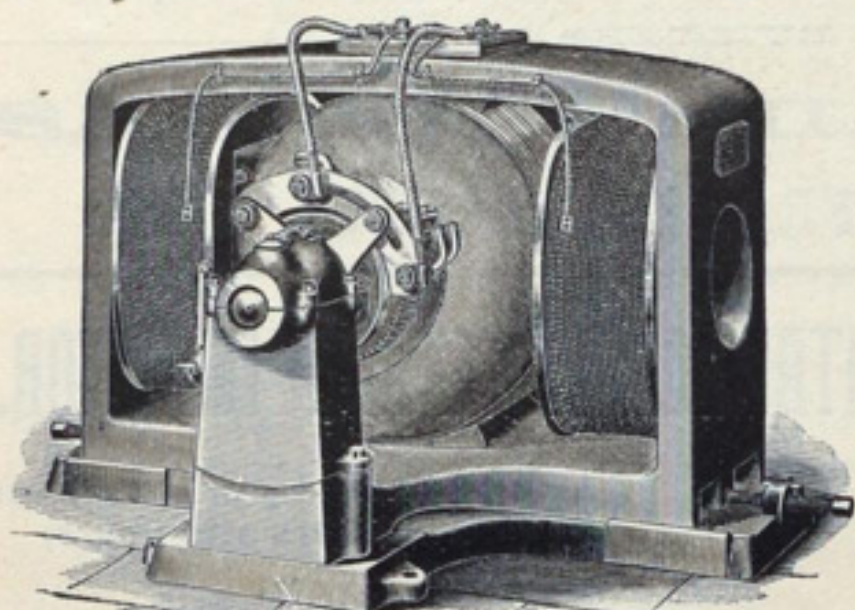
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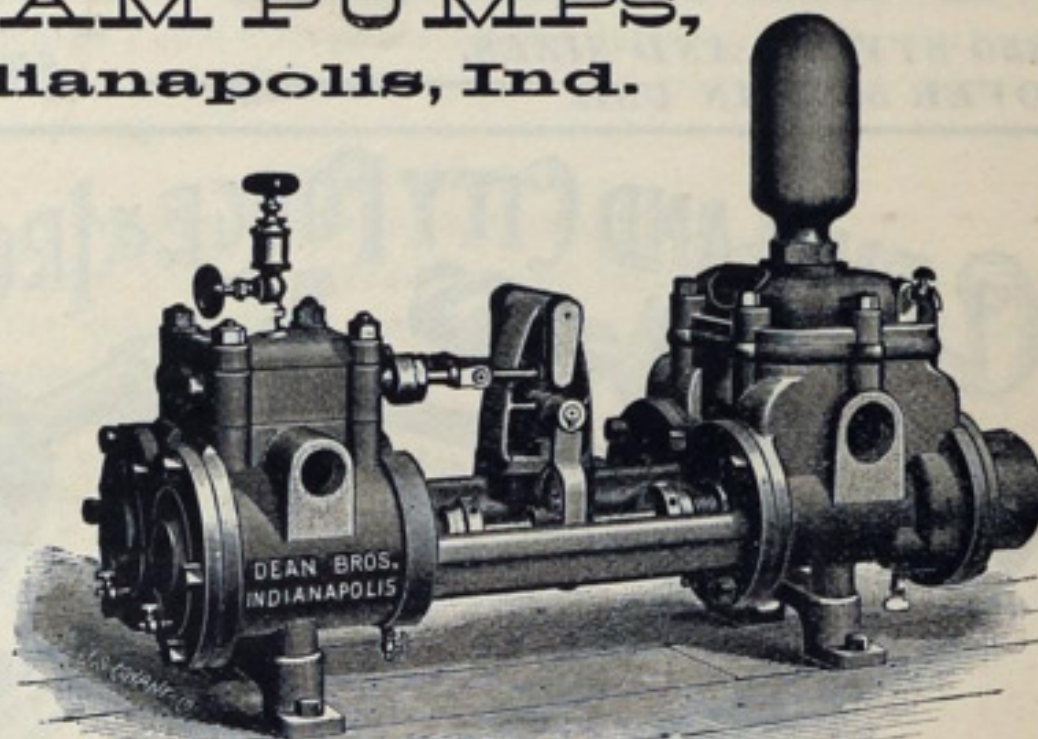
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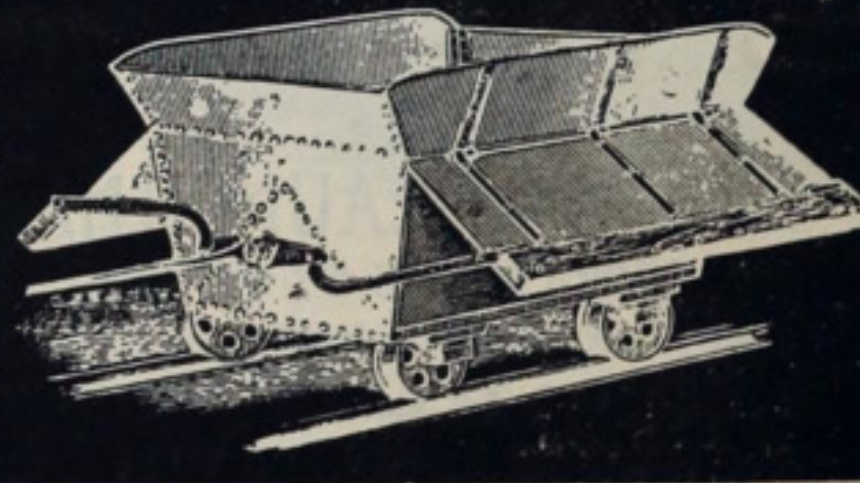
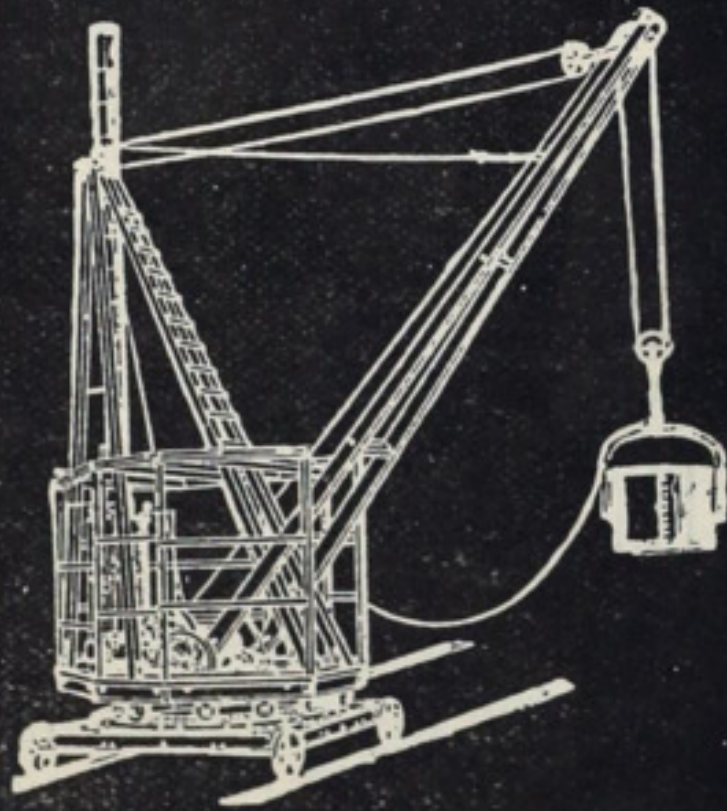
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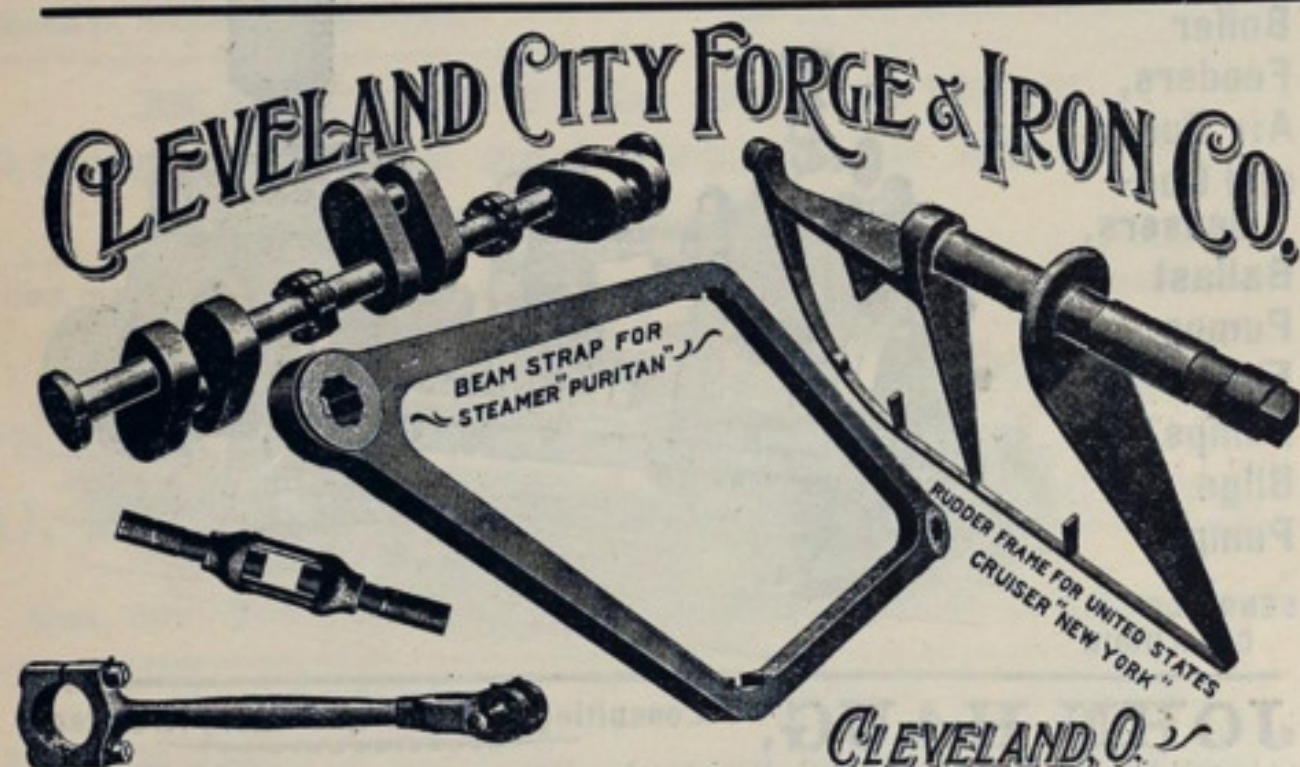
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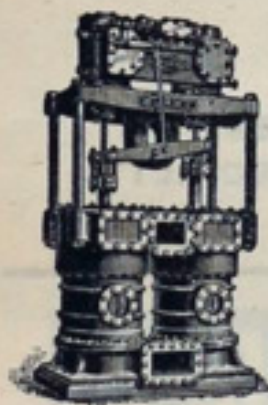
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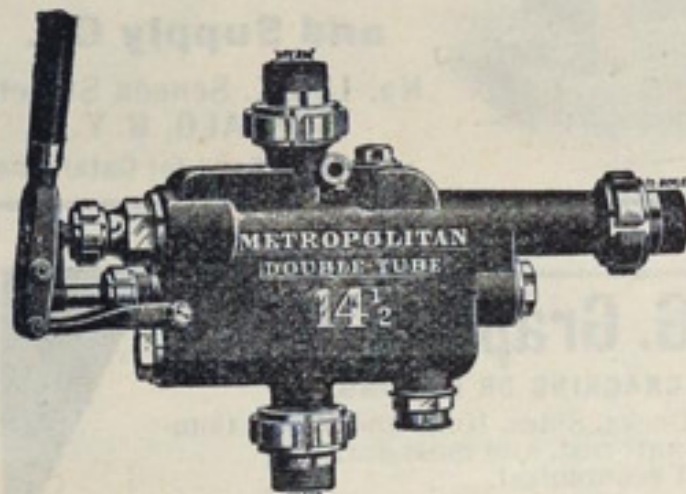
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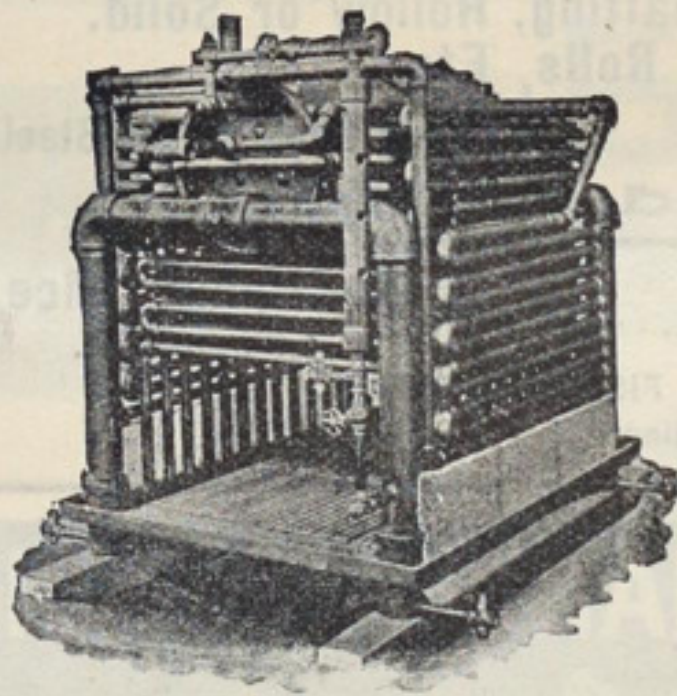
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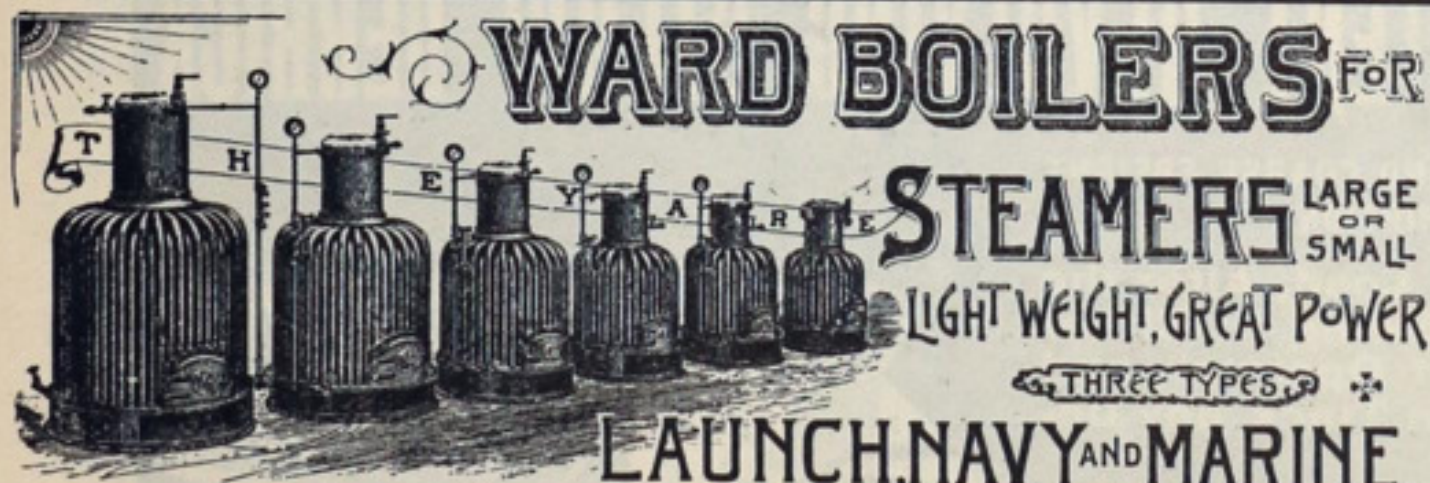
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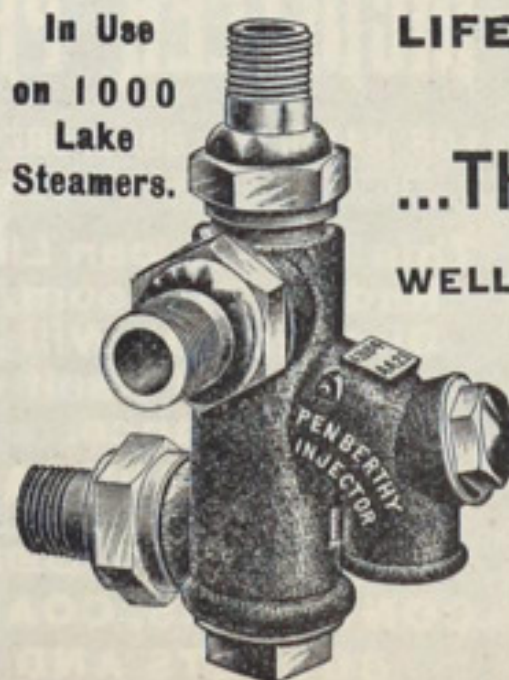
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